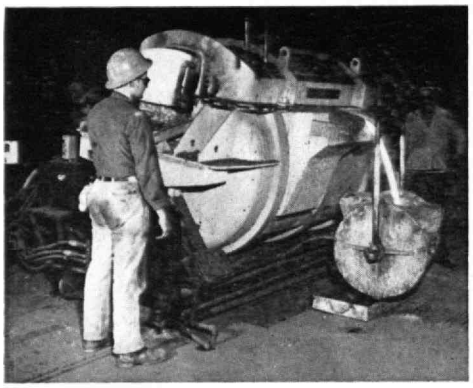
Technology Review

Edited at the Massachusetts Institute of Technology

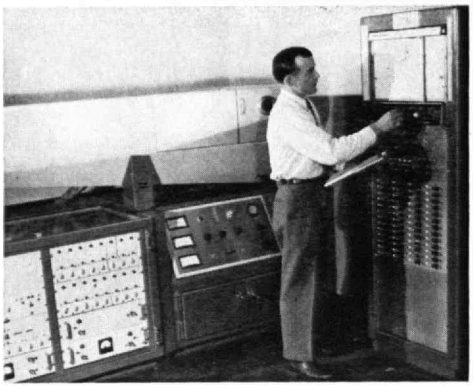
June, 1964

A Note on Excellence, Page 20

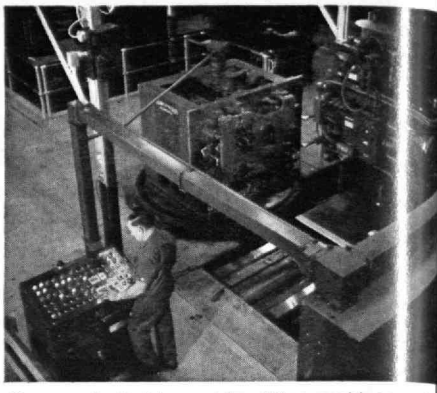
technology
review
Published by MIT



Induction heated holding furnace blends alloys of high strength gray iron.



Spectrographic analyses guarantee iron chemistry that meets Draper quality specifications.



Tape controlled loom side milling machines produce the ultimate in precision and uniformity.

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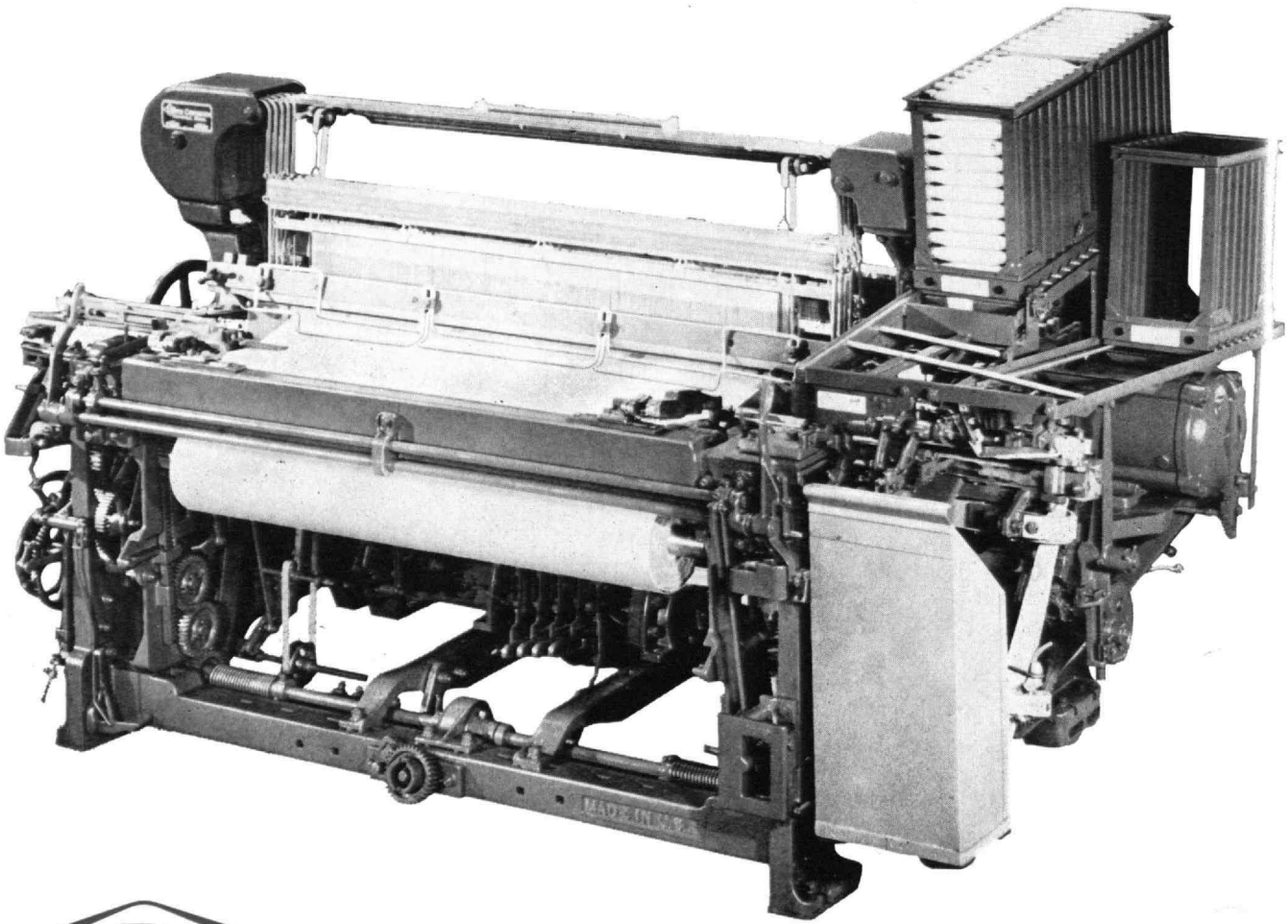

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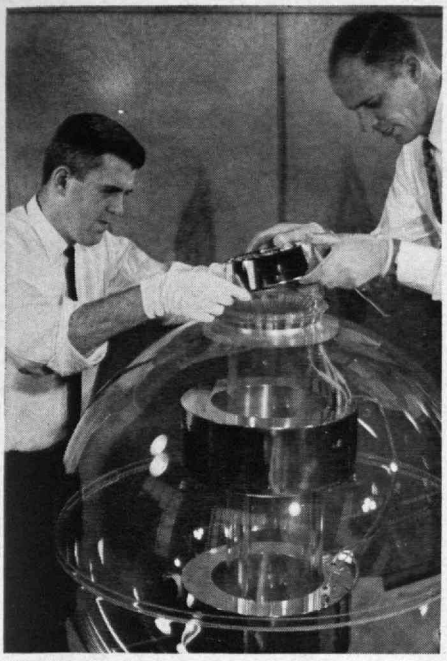
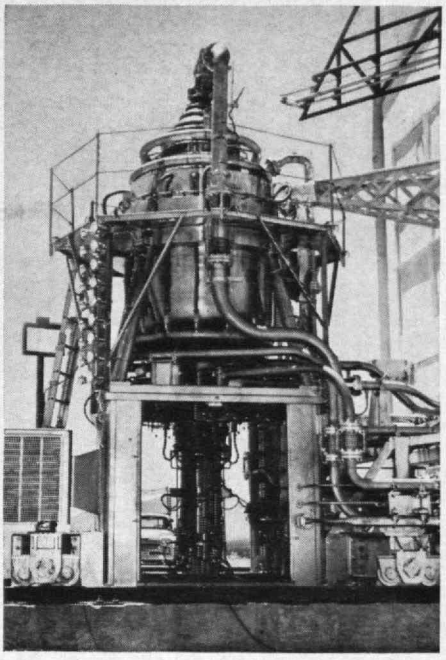
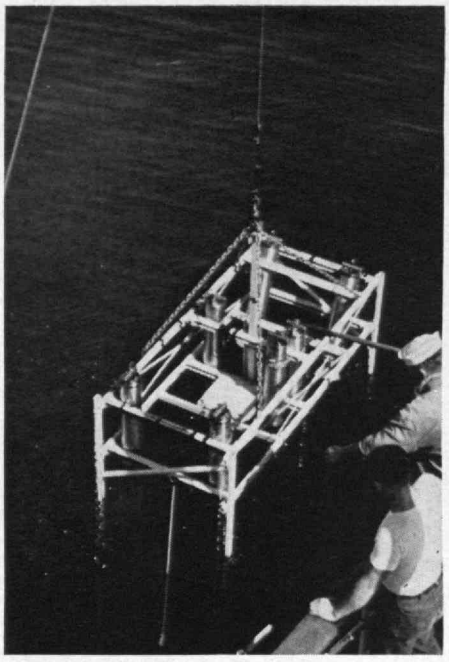


EG&G's pulsed light beacon on the ANNA Geodetic satellite facilitates tracking by optical instruments.





EG&G supplies a broad range of photographic and seismic instrumentation for oceanography.

Contributing significantly to Boston's science-industries and the community

It isn't every day that EG&G scientists work on satellite systems, instrument nuclear rocket test stands, or operate oceanographic cameras at a depth of 25,000 feet. For, it takes time and preparation to do these things successfully. But EG&G people are often involved in the unusual, often come up with the unexpected.

EG&G scientists, for instance, have developed methods for taking photographs at a millionth of a second — useful for detailed studies of the first instant of a nuclear explosion. Exotic oceanographic equipment has been developed for profiling the ocean's sub-bottom — useful for everyone from oil geologists and archeologists to fishermen looking for shrimp beds. EG&G's newest flash tubes are being used in a range of devices from powerful lasers to night aerial photographic equipment and geodetic satellites.

Broad experience in nuclear technology has led EG&G scientists into studies for peaceful uses of nuclear energy — the creation of harbors, reservoirs, and canals. EG&G people are continually improving radiation detection and counting systems developed for the Atomic Energy Commission — systems so precise that they can detect radiation many times below natural radiation levels.

EG&G reflects in many ways the wide scope of the scientific community that has sprung up around Boston. And EG&G is pleased to be a part of The New Boston, part of the change from a non-technical to a science-based industry. To EG&G, pioneering in advanced electronics and nuclear physics has meant growth. And its growth has benefited the community. From less than a score of people a decade ago, EG&G has more than 2000 employees in the Greater Boston area, Las Vegas, Nevada, Santa Barbara, California, and Albuquerque, New Mexico.

EG&G is an equal opportunity employer and qualified engineers, scientists, and technicians, who seek varied and unusual opportunities, are encouraged to write or drop by the EG&G offices.

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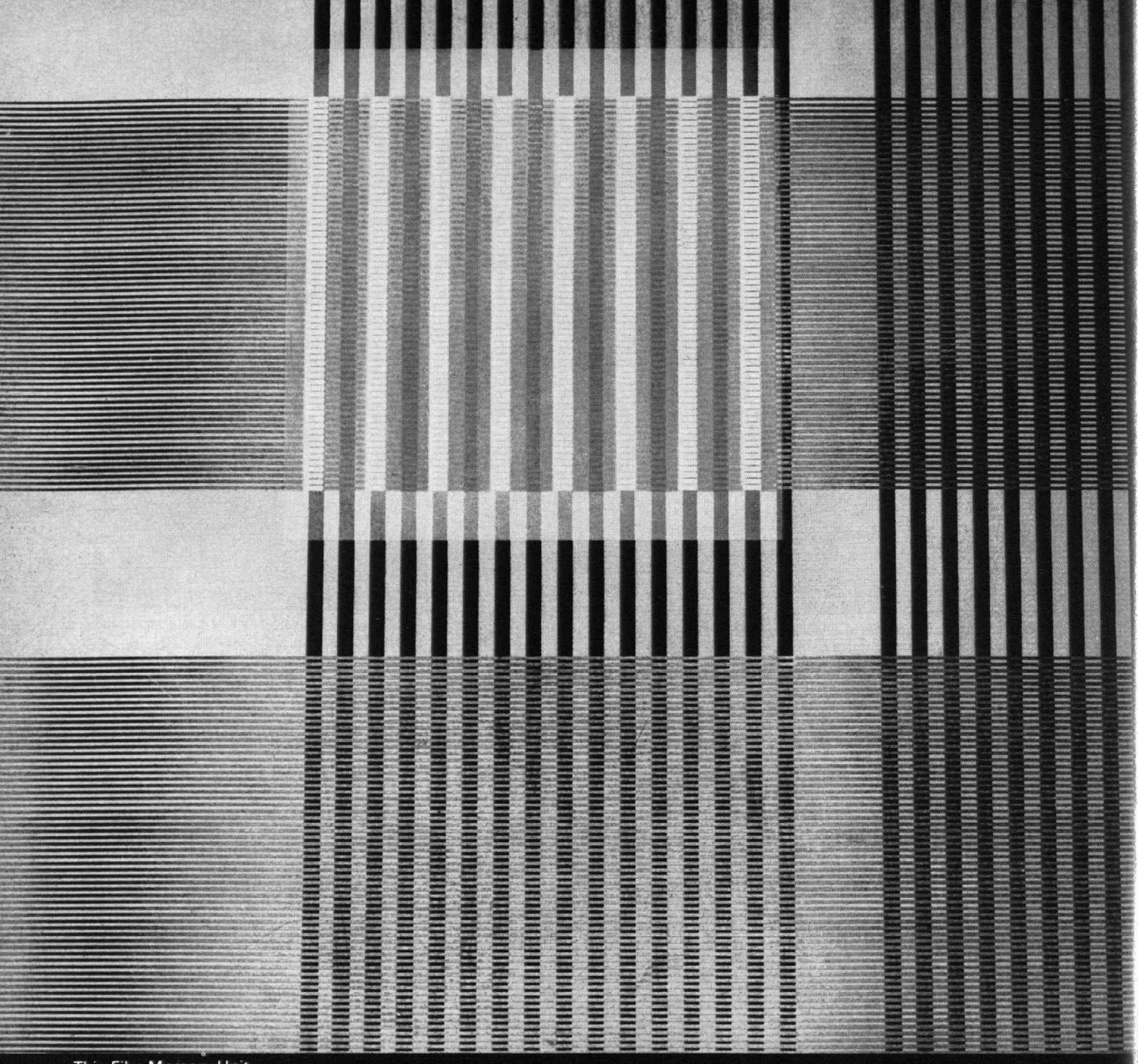

Thin Film Memory Unit

Lincoln Laboratory, a research center of the Massachusetts Institute of Technology, conducts investigations in selected areas of advanced electronics, with emphasis on applications to national defense and space exploration. The *Information Processing research program* is directed toward enriching the technology of digital computers, developing improved techniques for automatic data processing systems, and increasing understanding of the interaction between computers and their users. All qualified applicants will receive consideration for employment without regard to race, creed, color or national origin. Lincoln Laboratory, M.I.T., Box 28, Lexington 73, Massachusetts.

Solid State Physics
Information Processing
Radio Physics and Astronomy
Radar Design
Control Systems
Space Surveillance Techniques
Re-entry Physics
Space Communications

A description of the Laboratory's work will be sent upon request.

WELLES BOSWORTH, '89, *architect of the main M.I.T. buildings, observed his 95th birthday on May 9 in France. "A Note on Excellence" (on page 20) of The Review this month, by Fred G. Fassett, Jr., Dean of Residence, is a tribute to his work.*

TECHNOLOGY REVIEW is published monthly from November to July inclusive, on the 27th day of the month preceding the date of issue, by the Alumni Association of the Massachusetts Institute of Technology. All correspondence regarding its editorial contents, subscriptions, advertising, and changes of address should be addressed to:

Room 1-281, M.I.T.,
Cambridge, Mass. 02139

The Review's publisher and editor is *Volta Torrey;* business manager, *R. T. Jope, '28;* assistant to the editor, *Ruth King;* and class news editor, *Roberta A. Clark*. Editorial consultants are *J. J. Rowlands, Francis E. Wylie,* and *John I. Mattill*. Members of its staff are *Marilyn Phillips* and *Maxine Kenny*.

Officers of the Alumni Association of M.I.T. are: *Robert H. Winters, '33,* President; *Donald P. Severance, '38,* Executive Vice-president; *F. Leroy Foster, '25,* and *Samuel A. Groves, '34,* Vice-presidents; and *Frederick G. Lehmann, '51,* Secretary.

An annual subscription to Technology Review is $4 in the U.S., $4.50 in Canada and elsewhere, and a single copy, 60 cents. Three weeks must be allowed to effect a change of address, for which both the old and the new address of the subscriber should be given.

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Technology Review

Reg. U.S. Pat. Off.

Edited at the Massachusetts Institute of Technology
Volume 66, Number 8

Contents

June, 1964

The Cover photograph by Major Morris is of a part of the Great Court at M.I.T. where Alumni will gather once more on June 15.

Individuals Noteworthy

Acting Dean

PROFESSOR Robert L. Bishop, Head of the Department of Economics and Social Science, will serve as acting dean of the M.I.T. School of Humanities and Social Science pending the appointment of a permanent successor to Dean John E. Burchard, '23, who will retire this month.

Professor Bishop was graduated *summa cum laude* from Harvard University in 1937, and also received his master's and doctor's degrees there after a year in Europe on a Sheldon Traveling Fellowship, and further study and teaching at Harvard. He came to M.I.T. in 1942, became an assistant professor in 1946, associate professor in 1950, and professor in 1957, and has headed the Department of Economics since 1958.

He was co-editor with P. A. Samuelson and J. R. Coleman of *Readings in Economics,* now in its third edition, and has in progress a basic graduate level text on economic analysis. His recent work has included applications of game theory to problems of economic bargaining and oligopoly, and he has been a consultant to textile, glass, and automotive concerns. He has also been a visiting professor at both Harvard and Brandeis Universities.

Professor Robert L. Bishop

The Billard Award

THE AWARD established by Gordon Y. Billard, '24, for contributions to the betterment of student life at M.I.T. was presented this year to William Speer, Associate Dean for Student Counseling. Previous winners were Professors Harold E. Edgerton, '27, and Samuel Mason, '47.

CHAIRMAN JAMES R. KILLIAN, JR., 26, *of the M.I.T. Corporation, and Chairman George P. Miller of the House Committee on Science and Astronautics, discussed "Science and Public Policy" at an April 9 meeting of the M.I.T. Alumni Center of New York. Dr. Killian's views are reported on page 17.*

Alumni Officers

IN THIS SPRING'S balloting, members of the M.I.T. Alumni Association elected *Donald F. Carpenter, '22,* as president for one year; *Philip H. Peters, '37,* as vice-president for two years, and *Francis M. Mead, '29,* and *William S. Edgerly, '49,* as executive committeemen for two years.

The Association's nominees for Alumni Term Membership on the M.I.T. Corporation were *Emilio G. Collado, '31, Ivan A. Getting, '33,* and *Samuel A. Groves, '34.*

As members of the National Nominating Committee, *Hugh S. Ferguson, '23,* was elected from District 1; *R. Barry Graham, '39,* District 2; *Charles F. Payne, '33,* District 4, and *Clayton D. Grover, '22,* District 5.

For five-year terms as Class Representatives on the Alumni Council, the following were elected: *Andrew D. Fuller, '95, Elbert G. Allen, '00, Robert W. McLean, '05, Herbert S. Cleverdon, '10, Azel W. Mack, '15, Edwin D. Ryer, '20, F. Leroy Foster, '25, George P. Wadsworth, '30, John D. Hossfeld, '35, John L. Danforth, '40, Robert N. Maglathlin, '45, John T. Weaver, '50, John M. Farmer, '55,* and *Thomas H. Farquhar, '60.*

Positions of Prominence

VANNEVAR BUSH, '16, was designated one of three "Great Living Americans" this spring by the U. S. Chamber of Commerce. . . . Provost *Charles H. Townes* will be the keynote speaker at the Instrument Society of America's annual Instrument-Automation Conference in New York in October. . . . *Benjamin Lax, '49,* National Magnet Laboratory Director, discussed lasers at an American Physical Society seminar for the press in May.

Professors *Jule G. Charney* and *Harold E. Edgerton, '27,* have been elected to membership in the National Academy of Sciences. . . . Institute Professor *John C. Slater* has been appointed graduate research professor of physics and chemistry at the University of Florida and will divide his time between Florida and M.I.T. . . . Dean *Jerome B. Wiesner* spoke at the dedication of the Woods Hole Oceanographic Institution's new laboratory.

(Continued on page 6)

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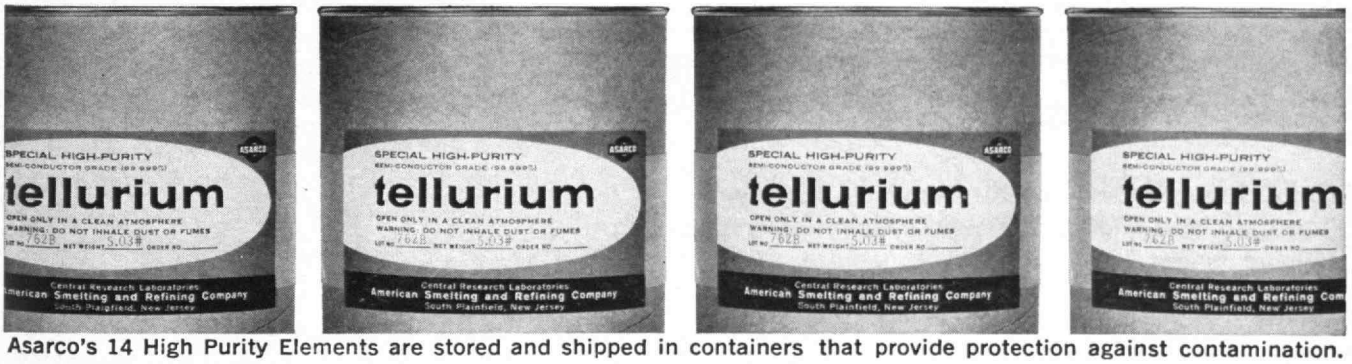

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ASARCO

Individuals Noteworthy

(Continued from page 4)

Language Scientist

ONE of the world's leading authorities on linguistics, Jerzy Kurylowicz, of the University of Krakow, will be a visiting professor at Harvard University and M.I.T. for 1964-1966. He will alternate between the two schools, spending one semester at M.I.T. and one at Harvard.

Professor Kurylowicz was born in Poland and holds the Ph.D. from Lwow and the diploma of the Ecole des Hautes Etudes in Paris. He has taught at Lwow, Breslau, and Krakow, and has honorary degrees from Paris and Dublin.

This is the second joint appointment in linguistics for Harvard and M.I.T. Another leading authority on the Indo-European family of languages and general linguistic theory, Professor Roman Jakobson, has taught at both institutions for several years.

At Magnet Laboratory

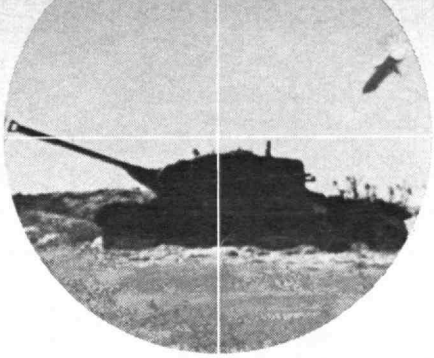
ARTHUR J. FREEMAN, '52, Head of the Theoretical Physics Group in the National Magnet Laboratory, has also assumed the new post of associate director of the laboratory.

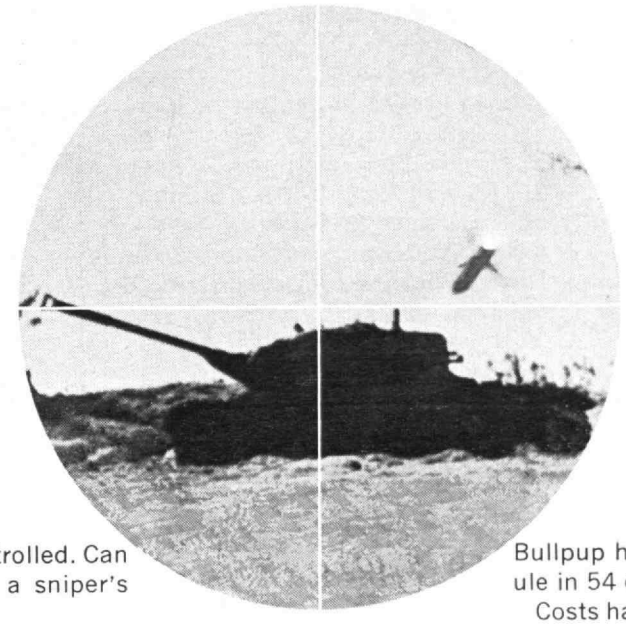
A native of Poland, he received his doctorate in physics at M.I.T. in 1956, taught at Brandeis and Northeastern Universities, and was employed as a solid state physicist at the U.S. Army Materials Research Agency from 1956 to 1962. During this period Dr. Freeman was also a Guest member of the Solid State and Molecular Theory Group at M.I.T., headed by Institute Professor John C. Slater, and since 1962 he has been a member of the Magnet Laboratory's staff. He is a Fellow of the American Physical Society and has been active in both theoretical and experimental research.

Freshmen's Friend

ASSISTANT Professor Paul E. Gray, '54, of the Department of Electrical Engineering, will succeed Associate Professor Nathan H. Cook, '50, of the Department of Mechanical Engineering, as chairman of the Freshman Advisory Council at M.I.T. next year. The Council includes 83 members of the Faculty and provides a broad variety of advisory services to new students.

(Continued on page 10)





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Unique status: operational with three services—Navy, Air Force, Marines.

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Its new Martin-developed guidance system exceeds specifications by more than 50%.

Photos of Weapons Effects Test, Eglin AFB, Fla.

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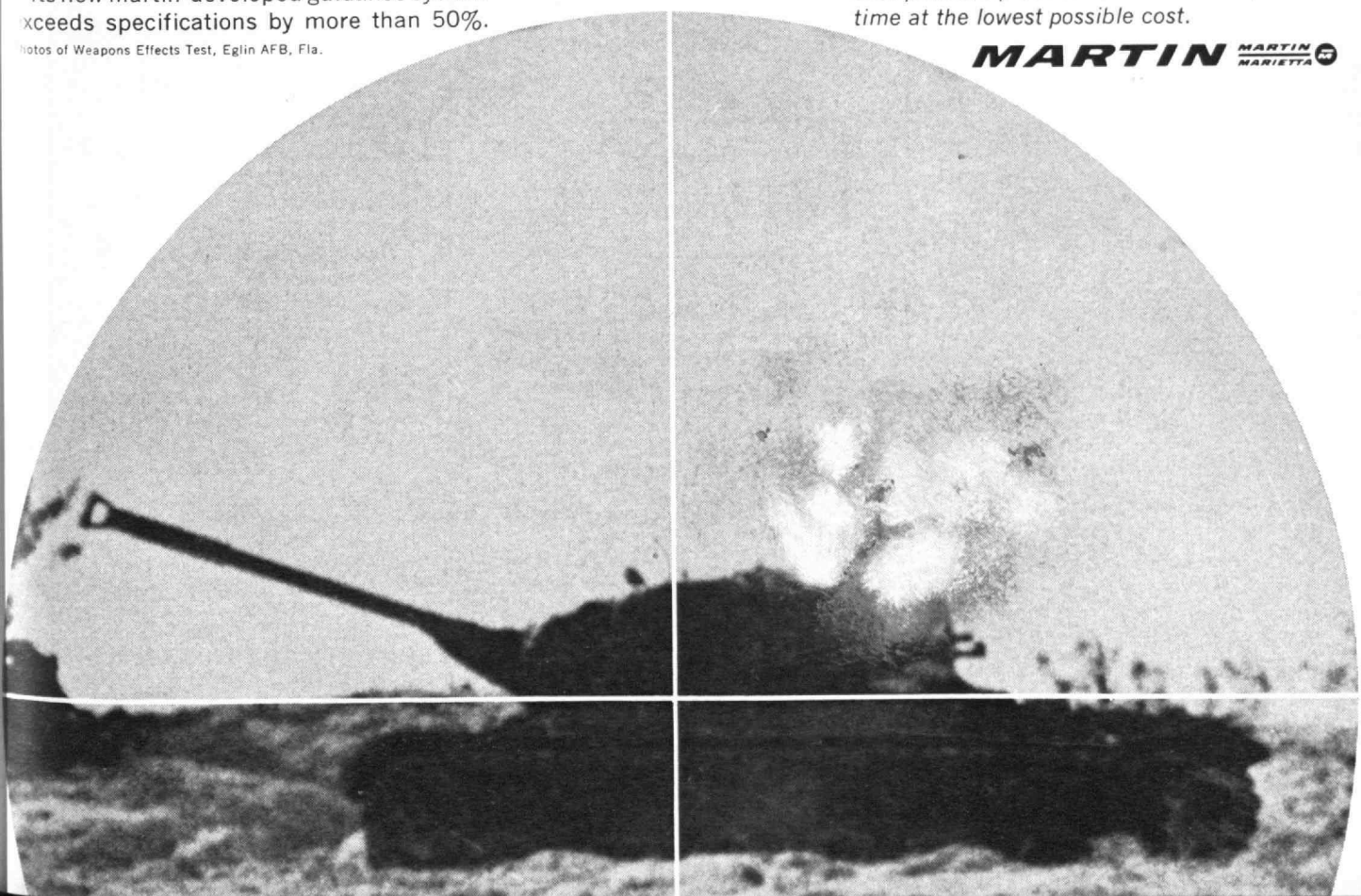


Individuals Noteworthy

(Continued from page 6)

Honors to Alumni

RECIPIENTS of recent awards and similar distinctions have included:

Frederick H. Norton, '18, the Albert Bleininger Memorial Medal and Scroll "for distinguished achievement in the field of ceramics" by the Pittsburgh Section, American Ceramic Society . . . *Vernon G. MacKenzie, '27,* the Distinguished Service Medal, by the Public Health Service, U.S. Department of Health, Education, and Welfare . . . *Richard Roth, '28,* as a member of the architectural firm of Emery Roth & Sons, an award "for excellence in new and remodeled structures in the Fifth Avenue [New York] area" by the Fifth Avenue Association;

Philip Donely, '31, the 1964 Laura Taber Barbour Air Safety Award by the Flight Safety Foundation . . . *John A. Feroli, '44,* named as Maryland's 1963 Civil Servant of the Year by the Federal Business Association of Maryland . . . *Colonel Thaddeus M. Nosek, '47,* the Legion of Merit Award by the U.S. Army . . . *Leonard F. Herzog, 2d, '52,* the American Success Story Award by the Free Enterprise Awards Association, Inc.

(Continued on page 52)

PERFECTIONIST

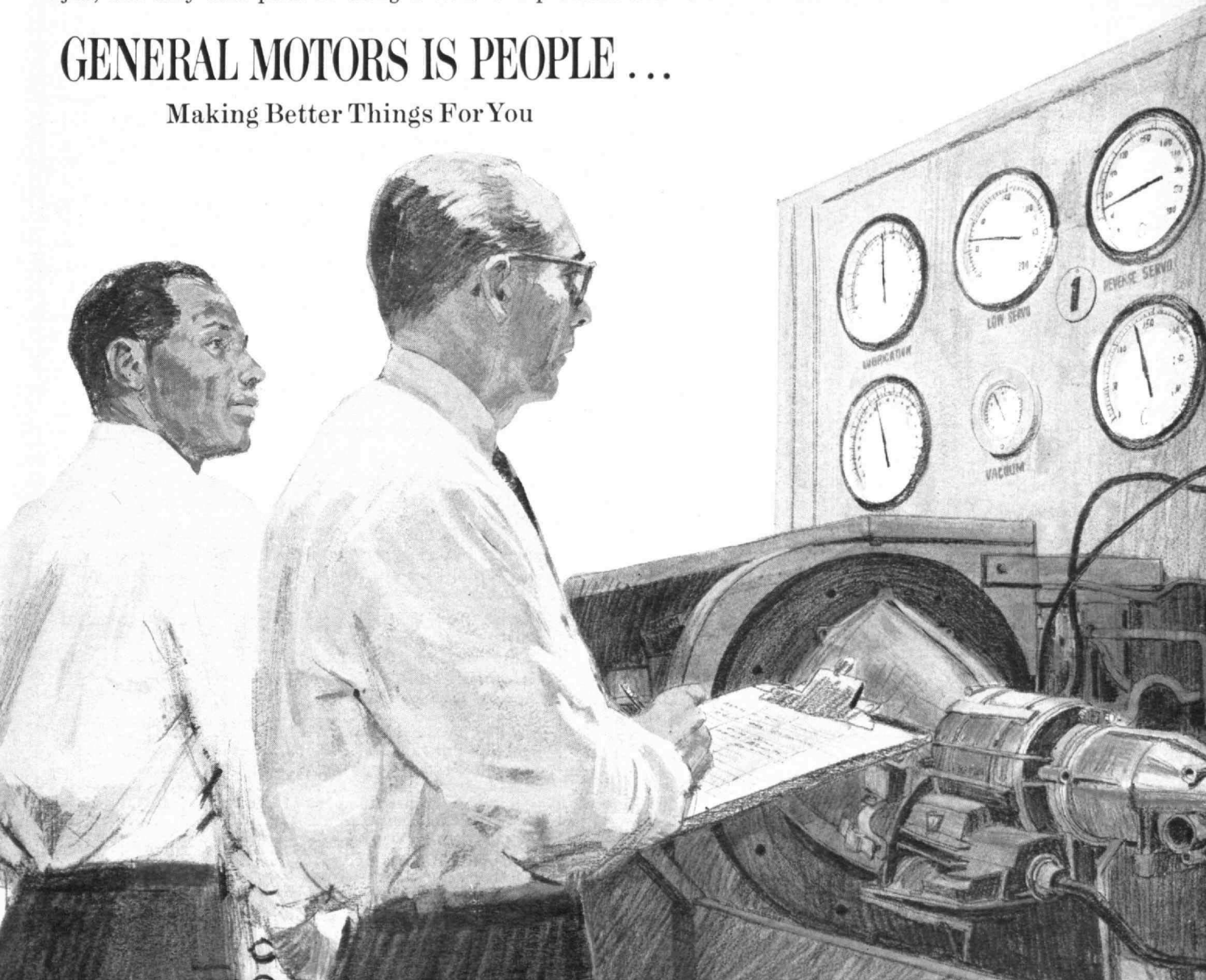
Assignment: Quality Control. He's a very special engineer at General Motors—a key man in a corporation which regards product dependability as a prime responsibility to its customers. He and a GM inspector are shown giving this transmission a final check. In addition to keeping an eagle eye on every phase of manufacturing, the quality control engineer is closely concerned with preliminary design and engineering. More than 13,000 individual parts go into a GM car, and every one must be as reliable as men and machines can make it. Raw materials, components, subassemblies—*all* get meticulous scrutiny. Tolerances to within *fifty millionths* of an inch are commonplace.

Among GM production employes, about *one of every twelve* devotes full time to quality control or inspection. Approximately 50,000 inspections are involved in the building of a single car. In addition, every machine operator has the responsibility for the quality of his work and performance of his machine. He can accept or reject any part he makes. His work is checked by the quality control engineer and the inspector, who analyze machine capabilities and predict machine inaccuracy *before* it occurs—not after.

They're mighty important people, these GM quality control engineers. They have an exacting job, and they take pride in doing it well. GM products bear witness to their effectiveness.

GENERAL MOTORS IS PEOPLE . . .

Making Better Things For You



Index to Advertisers

June, 1964

Is it a fact that a leader in nuclear research has a hand in bringing music to the Wilkies' family picnic?

Few people would be surprised to learn that a company which started mining and milling uranium ore more than 20 years ago would emerge as one of the world's most diversified private enterprises in the field of atomic energy. Today, it manages the atomic energy facilities at Oak Ridge, Tennessee, and Paducah, Kentucky, for the U.S. Atomic Energy Commission; ships radioisotopes all over the world; and operates its own nuclear research center.

And you'd certainly expect that the manufacturer of more than 400 different types of "Eveready" batteries would make the batteries preferred most for portable radios. The Wilkie family can take Bach, Basie or the baseball game anywhere they go.

But would the awesome tasks of nuclear research and the mass production of tiny batteries ever be performed within the same company? Not unless the company happened to be Union Carbide.

With Union Carbide, surprising diversification is almost commonplace. It makes half a dozen major plastics, as well as plastic bottles and packaging films; and it is one of the world's largest producers of petrochemicals. It makes the largest graphite cylinders ever produced, for use in rocket exhaust nozzles, and the arc carbons for motion picture projectors. It liquefies gases, including those that will power men to the moon. And among Union Carbide's other consumer products are such world-leaders as "Prestone" brand anti-freeze and "6-12" insect repellent.

In fact, few other corporations are so deeply involved in so many different skills and activities that will affect the technical and production capabilities of our next century.

It sounds good to the Wilkies.

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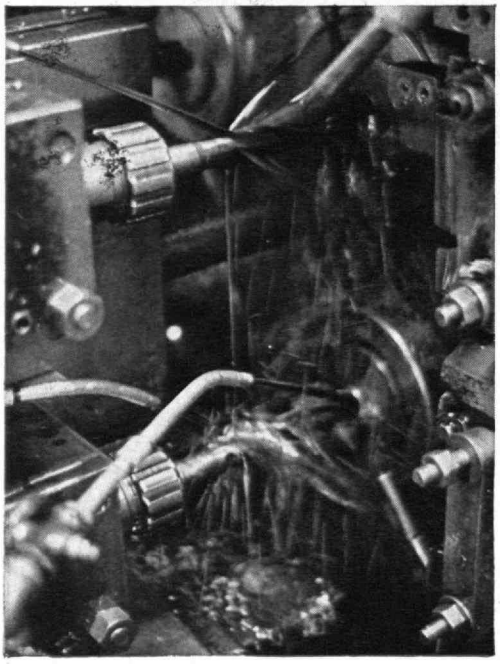

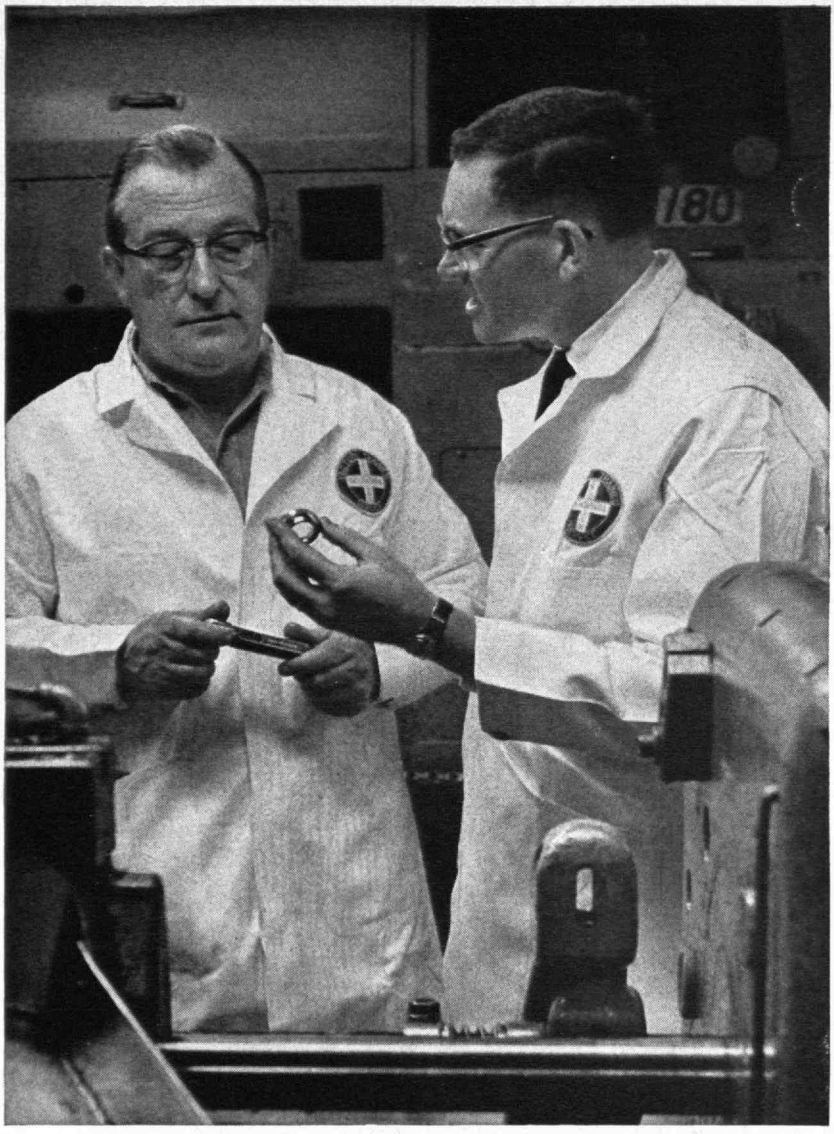

Bob Turley, on right, American Oil Company Sales Engineer discusses cutting oil problem with Walter Binkley of Schwinn Bicycle Company.

When you drill·tap·form·mill·shape all in 22 seconds...

what do you use for oil?

That's the kind of problem a sales engineer here at American Oil comes up against. It actually happened to Bob Turley when the Schwinn Bicycle Company asked him what oil he'd recommend for this complicated metal cutting problem. He had the answer—one of our special cutting oils—he solved the problem, and made the sale.

Bob's a graduate of Purdue—and the American Oil Company Sales Engineering School. He knows machines and oils. He's our "outside" man with the inside track on lubricants. And, he likes meeting people. That's why he's a sales engineer, combining two fields into a successful career.

Bob's a mechanical engineer. Yet, he might have been working for us if he were a metallurgist, chemist, mathematician or physicist. Petroleum takes on a multitude of uses and requires people of every skill. For information regarding a career in sales engineering or other fields, write to C. L. Wells, Room 1036, American Oil Company, 910 S. Michigan Avenue, Chicago, Ill. ZIP Code 60680

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CHEMICAL PLANT ENGINEERING & CONSTRUCTION

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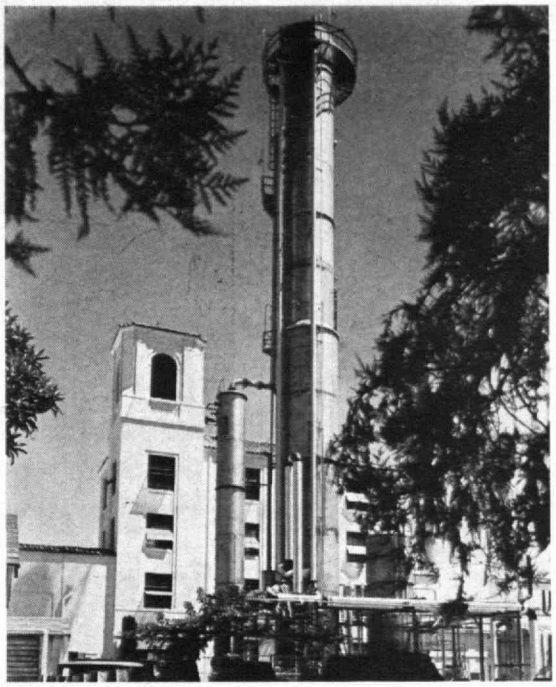

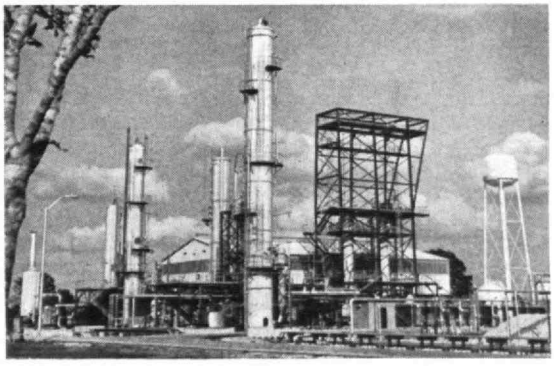

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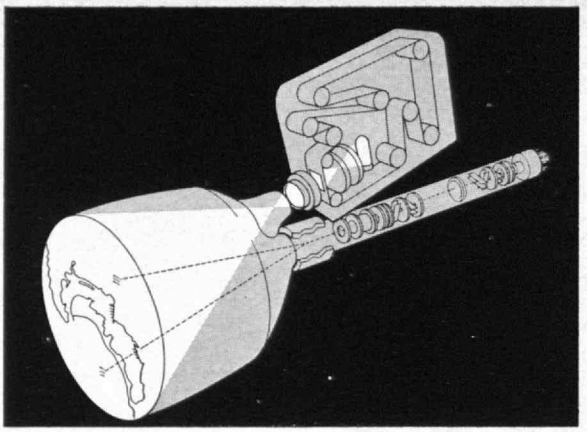

New "rear window" display console saves computer time

A unique new display console has been developed which frees the computer from time-consuming production of repetitive material. It is the new S-C 1090 which combines simultaneous cathode ray presentations and film frames on the face of the same tube.

A prime advantage of the new display console is that valuable computer and dynamic display time is not wasted on infrequently changing background data. Maps, business or engineering forms, etc., may be projected on the face of the tube from the inside, in color or black and white, using the built-in film projector. Changing information is superimposed on this image by a CHARACTRON® Shaped Beam Tube. Specific film frames can be selected manually or automatically by the computer.

The new development uses a "rear window" tube, so called because the filmed data is projected through a small window located next to the cathode ray gun. The film image is projected onto the inner phosphor-covered surface of the tube from the back and is easily visible from the outside.

The special CHARACTRON Shaped Beam Tube forms alphanumeric or symbolic characters for display on the face of the tube at high speeds. A metal matrix placed within the neck of these tubes produces characters of great clarity. A bright, high resolution spot writing beam is also available to display data from analog inputs simultaneously.

In a typical application, such as tactical air operations, various maps of the tactical area can be produced on film and projected on the screen of the S-C 1090 Console. The computer is then free to present only dynamic data such as movement of aircraft with associated descriptive information.

In business or engineering applications, forms may be projected onto the tube face and filled in with alphanumeric data by the character generator. This compact film projector is offered as a custom option on the standard S-C 1090 Direct View Display Console. For additional information, write to Dept. E-27, General Dynamics | Electronics, Post Office Box 127, San Diego, California 92112.

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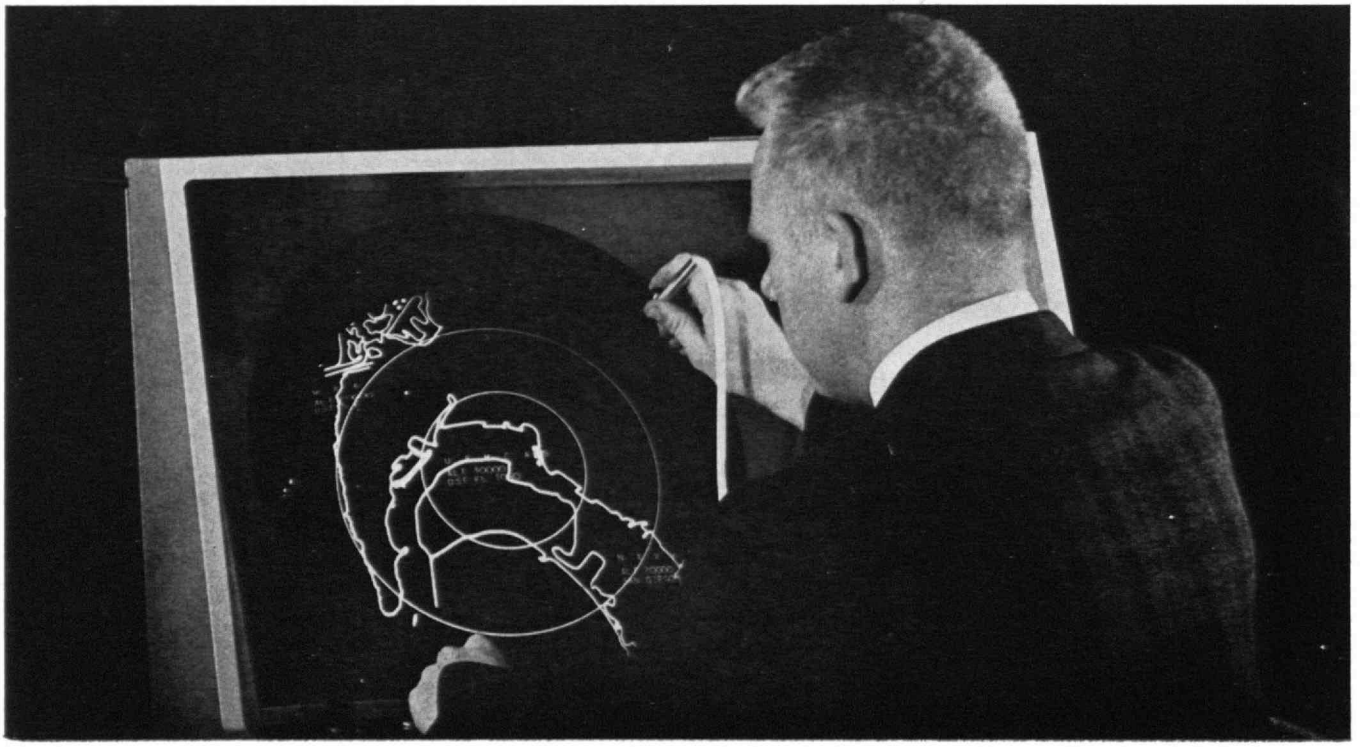


The Innovation Industry In Transition

An address given at a New York Alumni Center dinner by the M.I.T. Corporation's Chairman

BY JAMES R. KILLIAN, JR., '26

LET US call it the innovation industry*—shorthand for "Research, Development, Test, and Evaluation." After an agonizingly slow start in the United States it came to maturity in World War II. Today it is an $18 billion industry representing nearly 3 per cent of the gross national product. That part of the industry devoted to scientific research and development alone engages the efforts of over 400,000 scientists and engineers.

The growth of our innovation industry is a measure of the progress of the United States toward becoming a research-based society. From the very earliest days of the Republic, it has been recognized that knowledge is power and that the nation grew stronger by taming nature than it could by framing ideologies. So today we have the research society, affluent in the production of knowledge as well as dollars, with planned discovery, innovation, and experiment constantly renewing its vitality and harnessing the future for the benefit of the present.

When we think of research, we tend to think in terms of science where it has had its greatest exploitation; yet it has great importance in other fields. Spurred on by the spirit and success of science, the social sciences are gaining new powers and usefulness through research, affording new hope that man may achieve some gains in understanding himself as well as nature.

The art of management provides an example. In a recent article in the *Harvard Business Review* on new concepts of management, Professors Philip E. Slater and Warren G. Bennis, '55, observed that "the challenges facing modern enterprises are, at base, *knowledge*-gathering, *truth*-requiring dilemmas . . . The process of problem-solving, conflict resolution, and recognition of dilemmas have great kinship with the academic pursuit of truth. The institution of science is the only institution based on and geared for change. It is built not only to adapt to change, but to overthrow and create change. So it is—and will be—with modern industrial enterprises." So it is and will be increasingly with almost every department of our national effort. We have built a great and growing innovation industry the output of which is a high velocity of change and an exponential growth of knowledge.

During this period of rapid growth of scientific research, the government has become its principal source of support, and the government's investment, prompted mainly by the requirements of defense and of space exploration, has now grown to an annual rate of $15 billion (of which only about $1.5 billion is for basic research). Obviously the rate of growth we have witnessed in the last two decades cannot continue because of a limit on both dollars and men. We have, in fact, reached a point where clearly it is in the national interest to take stock. Are we getting our money's worth? Recognizing that the recent rate of growth will probably not continue, how much additional growth should we accept? Under conditions of lessened growth, how do we establish priorities? Are there imbalances in our total effort? These questions and others are being properly asked today by Congress, by the Executive Branch, and by the public. They are also being asked by the scientific community itself, as shown by a succession of reports now appearing which deal with science and public policy. One waggish scientist has likened our national management of science in recent years "to a ship with a thousand helms all connected to one rudder with rubber bands." Somehow, though, the ship has regularly made port with highly valuable cargoes.

This period of transition and stocktaking is crucial for the future of science in the nation, and it is of the utmost importance that we marshal the best wisdom we have to shape any new policies that appear to be needed, especially policies relating Government to science.

IN THE spirit of the dialogue now taking place, let me make some personal observations about factors which seem to me to be important as we review present practices and establish future goals.

The evidence is conclusive that the United States now holds world leadership in science. American science today, as Duncan says in *Macbeth,* is "full of

* Metaphorically akin to the "knowledge industry." See Machlup, Fritz: *The Production and Distribution of Knowledge in the United States* (Princeton University Press, 1962).

growing." Marked both by fecundity and brilliance, our effort is now of critical size, and it represents a powerful partnership between science and engineering, each augmenting the other. While not enough, we have university centers of science and engineering without equal, perhaps in the world. Foreign scientists leave their home countries to take advantage of the intellectual excitement, the *ambiance* of freedom and esteem for science they find here, the wealth of equipment, and the salubrious research environment, the absence of snobbish class distinctions separating science and engineering. The resulting "brain drain," or "unfavorable balance of trade" in technical personnel, as we know, has become a political issue for at least one of our allies.

This estimate I give is in striking contrast to the observation made by the economist Carl Snyder in 1902 that one could search the world's scientific literature in vain for references to distinguished American achievement. Implicit in this flourishing state of American science, however, are two implications which require careful consideration in this period of stocktaking.

The first is the danger, given our present strength, that we may rest on our oars, thinking that the race is won. Actually, we may be only at the beginning of unexampled scientific and engineering achievement, on the threshold of an Augustan age of unparalleled creativity. With the future so promising, this is not the time to relax our scientific effort or for timid talk about having reached some kind of ceiling in our upsurge of scientific and technological strength.

The second hazard is that our present massive effort and high confidence may obscure weaknesses still present in our program and lead us once again into complacency. Indeed in some quarters, the post-Sputnik sense of urgency having subsided, we seem again to be growing smug about our strength. As observers said in the midst of our consternation following Sputnik, we shifted overnight from apathy to panic, although what had happened hardly warranted such an extreme reaction. I have an uneasy feeling that the pendulum of our concern has now swung back to the contented self-satisfaction which lulled and charmed us during the months prior to October, 1957.

As we examine our programs, policies, and attitudes today, we should keep clearly in mind the importance of dampening out these extreme oscillations in our national attitude.

LET ME cite three examples which should give us pause as we preen ourselves on our scientific leadership.

The first is the competitive strength of our industrial technology. We are experiencing increasingly able competition from abroad. On the continent, industrial research is recapturing much of its prewar vigor, and we note reports in our professional press describing European industrial research as an "awakening giant." Britain is currently expending about 2.7 per cent of its GNP on research and development, a percentage close to that of the U.S.

In its 1964 report, released last month, the Joint Economic Committee of Congress noted evidence that our margin of technological superiority may be diminishing as other nations step up their research and development. The report makes the further observation that despite the huge size of our over-all effort, our current level and allocation of "R&D" expenditures may be inadequate for the "sustained and rapid economic growth we need" and that "the large increase in military and space research in recent years may have created an imbalance in the allocation of our research talent" leading to a shortchanging of research in some parts of the private sector.

Despite all we hear to the contrary, we have not yet created the incentives and conditions which would lead to a deep penetration of research and development into our industrial community.

As we congratulate ourselves on the present superiority of our industrial technology, let us not be bemused by "it-can't-happen-here" complacency. It did happen to Britain about 100 years ago. Prior to 1850 she had undisputed technological leadership, being the home of the industrial revolution. By 1870 she became content, however, and failed to recognize that technology required ceaseless development; there was a withering of innovation and enterprise. Meanwhile, Germany was discovering the contribution which science can make to technology. She pioneered in the development of innovation industry, her universities became seedbeds of new industry, and she took away from Britain world leadership in industrial technology. This *could* happen here.

A second example is the importance of maintaining undiminished a steady input of creative ideas in our advanced weapons technology. I am troubled when I hear statements about our having reached some kind of plateau in our invention and development of new weapons. I don't think we have, but I think it is of the utmost importance that we continue a high level of creative activity in this area. The cold war is not over; our military technology, to be superior and even adequate requires unceasing technological innovation and advance. There has been no partisanship in adhering to a national military policy that calls for us to maintain a margin of superiority as the best means for preserving the peace and making progress toward safe arms limitation. This margin, however, can only be maintained by an advancing military technology.

By the same token we must be so alert and far advanced in our own technology that we will not be surprised by another Sputnik-like event. We may elect not to do certain things, but we should not be taken by surprise and caught in a state of inadequacy. Our science and technology must be so good and so far out on the frontier that it is we who have the capability to anticipate advances and do things unimagined by others.

A third example which should give us concern lies in the domain of education. Our science education, especially our pre-college science education, while improving, is still hampered by obsolescence and mediocrity.

In a book, *Education, Manpower, and Economic Growth,* published recently, Frederick Harbison and Charles A. Myers develop some significant indices comparing the manpower resources of countries in various stages of development. One of their comparisons is the distribution of students between science and technology on the one hand, and humanities, law, and the arts on the other. In the percentage of its students studying science and technology, the United States stands substantially below the mean of 16 advanced countries. Sweden, Israel, West Germany, Finland,

Russia, Canada, France, United Kingdom, Belgium, Netherlands, and Australia, all have a higher percentage than the United States studying science or engineering. The Soviet percentage is twice that of the United States. We hear sometimes that we are overemphasizing science, but this comparison certainly does not support this contention. We actually face a problem of too few students electing science and engineering to meet our national needs. To cite but one need: The President's Science Advisory Committee has recommended that we at least double our production of doctorates in science, engineering, and mathematics by 1970.

Unquestionably government support in recent years has helped to meet these challenges. The Defense Education Act of 1958 has bettered science teaching resources in pre-college schools, as indeed it has strengthened language instruction. The program of the National Science Foundation for strengthening science and engineering at the college and university level has been profoundly important, as has its support of new curricular developments, such as the high school physics program initiated at M.I.T. The recent education act passed by Congress will help to meet the vast building needs of our rapidly growing system of higher education.

Federal support of research in educational institutions has served greatly to strengthen our universities as well as American science. This Federal support has been conceived and administered with remarkable effectiveness and, in turn, it has been well used by the universities. Federal support has helped to give American science the world leadership of which I have spoken. Even those of us who are strongly in favor of private institutions privately supported must acknowledge these great assists which the Federal Government has given education.

THESE general considerations and national requirements should be clearly in view as we re-examine our national science policies, especially those affecting government participation. In addition there are more specific questions which are currently being examined and debated. Let me note five of these.

First, there is the relation of private funds to public funds in supporting science, especially in our universities. On this question I would be loud and clear in voicing my convictions.

Despite the growth of government support, private funds creatively deployed must play a crucial role in the advancement of science. They are still the principal source of "freedom money" and essential venture capital. In a way not usually appropriate for government funds, they can assist the emerging young scientist and the promising new idea. In our private institutions they provide the core support that is essential for stability and independence and the pursuit of long-term goals. They help in protecting the freedom of science which is the essential for its strength and integrity. In all these ways, private funds increase the return on the large public funds which the scale and importance of science now require in the national interest.

Let us not forget, too, that it was private funds that largely created the great graduate schools in private universities which provided the largest number of centers of strength which the government turned to when it began to provide funds to strengthen science.

In my judgment, then, a sound national policy for science must call for the increase and creative use of funds from foundations, corporations, and individuals, along with government support, and the Federal Government as a matter of policy should encourage and facilitate this private support.

Second, there is the vital requirement that excellence be the touchstone of our national research planning. As the President's Science Advisory Committee has emphasized, "In science the excellent is not just better than the ordinary; it is almost all that matters. It is therefore fundamental that this country should energetically sustain and strongly reinforce first-rate work where it now exists." In the support of research, adherence to this policy by government agencies has been a major factor in giving U.S. science world leadership.

While continuing to reinforce existing centers of strength, we must also create new ones. We need more graduate schools of science and engineering as good as the best we now have. We achieve these, not by diminishing the strength or support of the existing great centers of strength but by encouraging others to develop. The program of institutional grants initiated by the National Science Foundation, is one way of beginning to build new centers of strength and to achieve a wider diffusion of scientists and engineers.

This is not done by building on weakness. It is done rather by identifying those institutions which have shown the initiative and mobilized the support to strengthen themselves. More communities and states should determinedly set about to strengthen their institutions to the point where sources of funds, public and private, can justify helping them grow stronger still.

Third, universities have an urgent responsibility, now that the volume of research they conduct has grown so great, to conduct and control it so that it clearly fulfills its educational function. It is my deep conviction, born of firsthand experience, that basic research in the university can serve to strengthen all of its educational activities but especially undergraduate education. I do not agree with many current statements that the great increase in basic research in recent years carries with it an inevitable diversion of interest, talent, and creative ideas from undergraduate teaching. On the contrary, there is ample evidence that the presence of a vigorous basic research program can serve to invigorate undergraduate teaching. Our universities have a superb opportunity to encourage the penetration of research into the undergraduate domain and to release the full potential of this research to enrich the teaching and to provide an atmosphere of creative vigor for both students and staff in undergraduate programs.

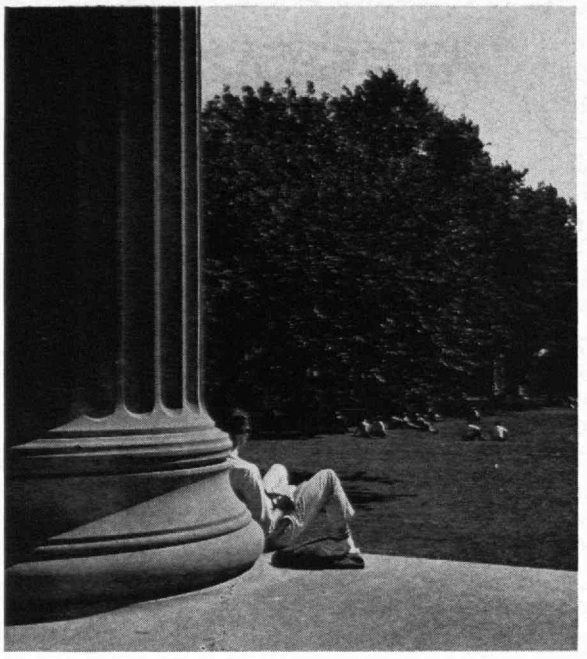
I TURN next to manpower utilization, one of the areas most requiring attention now that we are sponsoring such vast Research and Development efforts.

The way scientists and engineers deploy themselves and are utilized is more important than the way we allot our research and development dollar, although the two of course are linked.

About 60 per cent of all the scientists and engineers in Research and Development in the United States are

(Concluded on page 63)

A Note On Excellence



OF A springtime morning, a summer noontide, an autumn twilight, a moonlit winter eve, the Great Court of the Institute is a place of peace and beauty. A quality of warmth and friendliness invests it, and a sense of pause and poise, and its scale is human and humane, whether the lawns are filled with recumbent valetudinarians or a single sojourner is strolling the walks. I find pleasure in the fact that these things are so, and interest in pondering why. What are the subtleties that, melding, consummate in beauty? To ask this is to ask what excellence is, for excellence and beauty are reciprocals.

Grass, bushes, trees—these are the raw elements of forest or jungle, yet a subtlety may be compounded from them. Alone and scattered at random, they may combine to form Thoreau's "shaggy wilderness" where man has really no place of his own and where brute nature may yield a certain tingling thrill of terror to the sensitive observer, but where the civil soul finds little lasting joy. The evocation of subtleties from them demands the interposition of mind, of sensibility, of aesthetic expression and response.

When this is given, grass becomes terraced greensward; bushes, shaped hedge and flowering shrub; trees at random, ranges of pattern and stately comity; chaos, the beginning of cosmos. Visual cacophony has yielded then to motif, a theme suggested in the march of oak and elm, a counterpoint of flowering crabs, and melodies of rhododendrons blooming—a simple subtlety has been achieved, the human scale has been approached.

Approached, yet not attained. We ask, demand, more. This simple subtlety is not a whole. At best, it can no more than repeat itself on and on to the horizon, melding never, becoming zestless through recurrence. For a whole to be requires a limit, and man seeking wholeness is expressing the paradoxicality of his being, which at once demands that it be untrammeled and pleads that it be contained. The mountain lake, cupped by curves that blend as hill and valley, offers a whole that a *coup d'oeil* comprehends, and so speaks to man as the insensate repetitions of the vast and empty ocean never can.

The Great Court has its beauty because it is a whole, where the contained and the containing merge in excellence. Structure and site complement and sustain one another. The containing masses, strong in stylobate and entablature, soaring in pilaster and panel, are at one with the terraces and the trees they embrace. The colonnade of the entrance portico gives the full theme central emphasis. Rising above it, the Great Dome orients the whole.

Many are the subtleties that contribute to this achievement of beauty. The great architect who accomplished it, and who from faraway Vaucresson looks back with memory's eye to Cambridge has told already of one—the date-tab on the drum of the dome, of "enormous value there, for without it, the dome would seem to rotate." Lately he has told of others: Nature does not design with square and plumb line. Her subtle nuances can be traced and echoed in the refinements of which architecture is capable. In the court and entrance of the Institute, the architect has made all the parapet lines-against-the-sky incline gently, subtly, upward toward the culminating feature, the dome. Entasis marks the parapet edge, and flows into the upward lift that persuades the eye of the observer. The columns of the great colonnade he has set, not on a straight line from end to end, but on a curved line whose center is nine inches forward of its end points. Such subtleties, melding, consummate in beauty.

At the dedication of the Institute's Cambridge home in 1916, the role of Merlin the Enchanter was enacted in the inaugural pageant that filled the Great Court with dancers, personages, and symbolism. Pageantry and pomp have paled into the past. The enchantment remains. It is the enchantment of beauty, of excellence, which we owe to the artistry and the humane perception of the architect of the Institute: Welles Bosworth, '89.

—F. G. FASSETT, JR.

Why Civil Defense

A consideration of its effects if war comes, if not, and on the likelihood of nuclear war

BY EUGENE P. WIGNER

Palmer Physical Laboratory, Princeton University

PROPOSALS for civil defense raise questions regarding both what can be accomplished and the concomitant effects. The present discussion will be concerned only with the concomitant effects. As to the question of feasibility, it must suffice for the present to note that all who have seriously studied this question agree that civil defense preparations could drastically reduce the civilian casualties of a nuclear war.

Most of the contents of the present article have been stated before, though possibly not in as systematic a way.* We shall consider, first, the effects of civil defense preparations in case of a nuclear conflict; then, the effects of such preparations during a period of peace which may or may not be terminated by a conflict; and finally, the effects of civil defense preparations on the likelihood of a conflict.

To Save Lives

The self-evident effect of civil defense preparations in case of a nuclear conflict would be to save lives. This country spends very large sums each year to keep a secure striking force in instant readiness should an aggressive power attack the U.S. or one of its allies. But this defense system is aimed primarily at deterring aggression, that is, at making an attack so costly that the would-be aggressor would hesitate and in fact renounce force as a method for obtaining world hegemony. This system provides relatively little armor for the direct protection of the American people, their institutions, and their government in case a nuclear conflict should break out in spite of the measures taken to "deter" it. The reason is that, in this nuclear missile age, with offensive weapons so much more powerful than the defensive ones, there is a temptation to rely solely on the former.

Few will deny that a civil defense program could save many lives. These would be lives that could not be saved in any other way. Even if we build enough offensive weapons, Polaris submarines and Minutemen, to make our retaliatory power so great that it would be madness to attack us, it is conceivable that an accident or an erroneous belief that we could be knocked out could lead to an attack on the United States. A conviction that once the damage was done, the United States would not dare, or would not want, to retaliate, might also prompt an attack. In either case, no amount of additional striking power in the American arsenal would count for much. The enemy would be striking us in the teeth of our deterrent.

For protection the people of the United States can rely only on antiballistic weapons and on a civil defense system. From the information now available, it appears that an ABM system which would provide substantial protection for our nation without a civil defense system cannot be developed in the next 20 years. We conclude that in the aforementioned contingencies civil defense would have immense lifesaving value which cannot be replaced by any other defense.

At present a nuclear war seems unlikely. Hence, expensive precautions against such a war may seem extravagant. We suggest, however, that civil defense is very much like insurance. Almost everyone in this country is in some way insured. No one feels cheated if, after paying for fire insurance for 20 years, his house still stands uncharred. For civil defense, too, we must pay a premium to improve our chances of survival in case of an unlikely, but extremely destructive event—large-scale nuclear war. It is true that civil defense cannot protect us against many of the effects of a nuclear

THE AUTHOR is one of America's most honored physicists. Last year he not only shared a Nobel prize for his study of nuclear structure but also directed a study of civil defense that the National Academy of Sciences undertook for Assistant Secretary of Defense Steuart Pittman. Scores of authorities participated in that "Project Harbor" study at Woods Hole last summer. Professors Robert J. Hansen, '48, and Ithiel de Sola Pool, and many Alumni represented M.I.T. among them. Professor Wigner was greatly stimulated by members of the Harbor study and is particularly grateful to E. P. Blizard of the Oak Ridge National Laboratory for help in preparing this article.

*The many highly emotional articles written on the subject sometimes have submerged more closely reasoned ones. Among the latter, Nicholas Rosa's article of 1961 in *The Reporter*, Moldauer's article in the May, 1962, *Bulletin of the Atomic Scientists*, and Milton MacKaye's observations in the October, 1963, issue of *Nuclear News* come to mind.

war. Similarly, however, disease remains a scourge even if one's medical expenses are paid.

The obvious function of civil defense preparations to save lives is often forgotten and one focuses on the more subtle military, political, economic, and moral problems. These are important issues but they should not be permitted to obscure the central, self-evident function of civil defense, which is that in the rather unlikely event of a nuclear attack, civil defense will be crucially important to every citizen of our country.

To Expedite Recovery

People have argued that the lifesaving potential of civil defense is of little value, because, they say, the survivors of an attack will perish anyway as a result of the economic dislocations and "the living will envy the dead." Events in Eastern Germany and in Hungary refute this view; people have not lost the ability or desire to live in spite of a complete economic collapse, and in spite of the subsequent exploitation of the collapsed economy by a foreign power. It is true, however, that civil defense can do less toward safeguarding the economy than toward safeguarding lives.

No matter how a war originated, it would be lost if the United States failed to emerge from it as a viable nation, able to recover most of its economic power and societal structure within the lifetimes of most of its citizens. It is clear, nevertheless, that the recovery of a nation whose population had been largely preserved, and which had stockpiled enough necessities of life to last for several months following the catastrophe, would be faster, and would be accompanied by less suffering, than the recovery of a decimated nation, which had neglected to make the most elementary provisions.

Such statements as "the living will envy the dead" are not really arguments against civil defense, but forecasts of how bad the situation might be even if civil defense preparations are undertaken. They give no clues as to how these situations could be avoided, and civil defense measures certainly would alleviate rather than worsen postwar conditions.

Effects in Times of Peace

If we were sure that our freedom would never be challenged, we would not maintain a military establishment and there would be no need for civil defense. Both military preparations and those for civil defense imply a sacrifice in peacetime in order to minimize the consequences should war occur.

Opponents of civil defense, however, have charged that it would, in a sense, corrupt the ideals of the nation. This argument has assumed several forms. Some people contend that it is better to die standing up than to survive in a hole underground. Others are dismayed by the problems of admitting neighbors to a private shelter. Civil defense also has been accused of promoting a garrison state, of leading to a neurotic nation, and of being unconstructive and contributing nothing to the quest of peace. We shall consider all these points. The contradictions between some of them indicate, however, that they are more nearly expressions of a subconscious impulse than the results of reasoned argument, and we shall try to bring the nature of that impulse into the open.

Let us begin with the notion that it is somehow cowardly and unworthy of a man to crawl into a shelter and survive a nuclear attack. Would it be more becoming of him to stand in the open and die? Man has always sought shelter and protection from his enemies. As recently as World War II the symbol of the American soldier was a man in a foxhole. No one, least of all the soldier, thought it ill-fitting or cowardly to seek protection in a hole in the ground rather than to meet enemy shells fatally in the open. Hiding in a shelter, facing the reality of a situation, is far more courageous than hiding one's head in the sand and saying, "If only we are nice to one another, there won't be a nuclear war."

The problem of the man who is asked to share his already crowded shelter with the family of his neighbor is the same as that of the man who is asked, in the middle of winter, to share his last loaf of bread with his neighbor. He faces a serious moral problem for which we believe a solution should be looked for in the direction of providing everyone with a loaf of bread rather than depriving the first man of his loaf. Even if an ambitious civil defense program is instituted, terribly difficult decisions will have to be made, but the situation will be better the more complete the program.

It is true that the organization of a cadre of Civil Defenders would add another category to our many groups of federal employees, but we now have an army of more than two million men and this has not made us a garrison state. The Civilian Reserve Corps which we wish to see created in addition to the cadre of Civil Defenders would be largely a voluntary organization, well below the size of the armed forces.

For many of us, it is difficult to comment on the contention that civil defense preparations would make our people neurotic by reminding them of the possibility of a nuclear war. We see hospitals and cemeteries every day and they remind us of the possibility of dreadful diseases and that our lives will eventually end. But hospitals also assure us that we will be taken care of should sickness strike, and cemeteries assure us that our bodies shall have a resting place. We feel that we would be much more neurotic if we tried to forget the existence of disease and death. Further, we have seen many children whose nightmares ceased when their parents built shelters.

The last argument, that civil defense is not constructive and does not prepare us emotionally or politically for peace and co-operation, is, we believe, entirely correct. One can hardly expect however, that all of our activities do this. We do actively help new nations, and we will be able to do this only as long as we remain whole and unconquered. Civil defense in a real sense serves to armor a wellspring of democracy. Our influence in the world will be felt all the more if our population is safer.

The heterogeneity and incongruousness of the arguments concerning the alleged effects of civil defense on our lives raises the suspicion that they have an unadmitted, and perhaps subconscious, origin. We believe that this is so. Many of us are willing to pay our taxes to support the defense effort of the country but wish to hear nothing further about it. We wish to live in a refined atmosphere into which the brutal activities that the defense of our country imply do not penetrate. This

is a natural desire, particularly on the part of highly educated, sophisticated people. These are particularly afraid that they will not be able to disregard the existence of civil defense as they are able to disregard the grim functions for which the armed forces are prepared. Hence, they oppose civil defense and wish to leave the defense of the country to a force which they are willing to pay but not to respect. Unfortunately, no country has survived whose citizens considered its defense beneath their dignity.

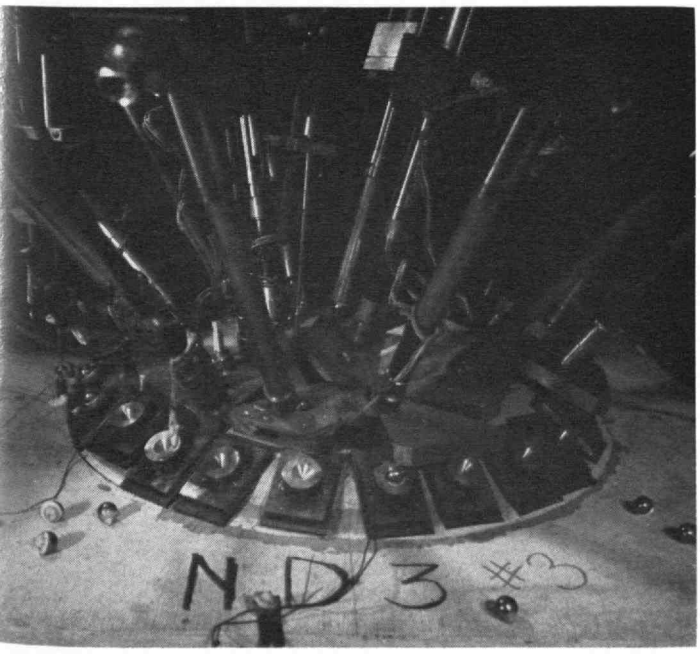
Effects on Likelihood of War

We now come to the question which we believe is uppermost in the minds of most Americans: Will civil defense preparations make a war more or less likely? It is impossible to foresee all of the effects of civil defense preparations, or of the absence of such preparations, on future relations between nations. The two principal effects of civil defense which we can foresee are, however, in the direction of peace.

The present precarious balance of international relations is caused, to a considerable extent, by the preponderance of offensive weapons over defensive ones. This preponderance gives the party striking first a great advantage. Hence, for those to whom a conflict appears in the long run unavoidable, there is a strong temptation to strike first. The situation would be even more "unstable" if there were only two contending parties, or if the one which temporarily has the upper hand (the U. S.) really yearned to destroy the other, rather than merely to remain undefeated.

Either strengthening the defensive capabilities or weakening the offensive power might reduce this instability. The most effective measure in the first direction would be a buildup of civil defense. Disarmament is a step in the second direction. Civil defense does not presuppose mutual confidence between the antagonists and does not raise the question of inspection. Effective civil defense, in fact, may be a necessary precursor of disarmament. Let us assume, for example, that the United States and the Soviet Union reach some accord on gradual disarmament, and that many weapons and missiles are destroyed. Some inspection system will be required, but none can guarantee that all weapons have been destroyed. Nor can any agreement erase from men's minds knowledge of how to produce weapons. After disarmament was ostensibly complete, the Soviet Union still could threaten us with a few weapons, which would be superior to no weapons at all. With our population protected, we could resist such threats for a few months, and gain the time required to assemble our own weapons again. Without civil defense, we would be at the mercy of the aggressor.

The few-weapon situation also could arise under other conditions. If some small country, ruled by a dictator, built or otherwise acquired a few megaton-size weapons, its ruler might be tempted to threaten the U.S. with a few bombs with primitive delivery systems, such as mined merchant ships or concealed bombs in cities, to gain a free hand in his part of the world. Such nuclear cloak-and-dagger methods seem far-fetched to us now, but they could appear inviting some day to the possessor of a few bombs seeking personal aggrandizement.



Knowledge of requirements for civil defense shelters is being increased by studies in the M.I.T. Models Laboratory. The photo is of hydraulic jack loading on a model of a re-enforced concrete dome.

The Effects on Leaders

It often has been said that the protection of our population might make our leaders more aggressive, and cause them to skirt the dangers of war with less trepidation. Civil defense, in other words, could increase the chances for war, but we shall give reasons for not believing this. The *absence* of civil defense also could generate aggressiveness in leaders aware of the advantages of striking the first blow.

Although many crises may arise, we do not believe that our elected leaders will risk war any more than absolutely necessary, whether or not the population is protected. Civil defense can never be absolute; it cannot save all of the people. War also would cause a tremendous loss in our productive facilities and transform our economy, virtually, into that of an underdeveloped nation. Hence, we do not believe that an American President ever would act more aggressively than necessary; reduction of possible casualties from perhaps 80 million to perhaps 20 million certainly would not make a President reckless. Times may come when national survival entails risks, and civil defense would minimize but not obviate them. Nuclear war will never be an attractive policy to a sane, responsible, informed leader.

The situation is by no means symmetric between the U.S. and its possible opponents. Human lives are more expendable in other cultures than in ours. It was not a U.S. President who declared that one-third of the present population of his country would still be ample. Also as far as the national wealth is concerned, the U.S. stands to lose more than any of its potential opponents. The danger that the U.S. would become reckless because it could protect its people is negligible compared with the danger that the government of one of its opponents might become reckless because the U.S. could *not* protect its people.

(Concluded on page 60)

Trend Of Affairs

Mr. Sloan's Contribution For Basic Research

THE ESTABLISHMENT of a $15 million "Alfred P. Sloan Fund for Basic Research in the Physical Sciences" was announced last month by Mr. Sloan, '95, and M.I.T. The fund will be created by consolidating a personal gift of $5 million by Mr. Sloan, a supporting gift of $5 million by the Alfred P. Sloan Foundation, and a previous grant of $5 million by the Foundation to M.I.T. for the same objective.

The concept originated with Mr. Sloan, who holds that although industry and government are making large resources available to support research in many categories and disciplines, too little is available for basic research. He defines basic research as "the quest for knowledge for knowledge' sake," and the fund is intended to help correct what he considers an imbalance between such research and applied research.

"It has been my conviction," Mr. Sloan said, "that if the country is to keep ahead in the competitive race for survival there must be not only greatly increased funds for basic research made available, but also competent and imaginative management of such funds. Both are highly consequential. The need for an expanded search for new knowledge, furthermore, is right before us. It is my hope that this fund will stimulate other private sources to make support available for this purpose, at M.I.T. and elsewhere."

The fund is to be absolutely free and expendable, both as to principal and interest, he emphasized, and will strengthen the private sector of the American educational complex. It will be managed by three administrators selected by the Executive Committee of the M.I.T. Corporation, one of whom must be a scientist of outstanding accomplishment. Those now designated are James R. Killian, Jr., '26, Chairman of the Corporation, President Julius A. Stratton, '23, and Provost Charles H. Townes of M.I.T.

Although primarily for research in the physical sciences, the income from the fund also may be applied in areas where basic development in those fields impinges on other sciences, such as biology. In addition, it may be used in the fields of mathematics, engineering, and the economics of production.

"The establishment of the Sloan Fund could hardly be more timely," said Dr. Killian. "It is vital that non-Federal support of science be increased. Funds are needed that can be used in a manner that affords great freedom in supporting the emerging scientist and the promising new idea. They make it possible to fill in gaps and to finance programs not ready to become projects. For all these reasons, M.I.T. views the establishment of this fund as one of the most important additions to its resources that could be made at the present time."

International Computing Service

FROM Edinburgh, Scotland, last April, Dr. M. V. Wilkes of the University of Cambridge, England, used an IBM 7094 computer at M.I.T. at the same time that four other persons at consoles in various parts of the Institute were using it. This was done to demonstrate Project MAC (multiple-access computing) at the British Computing Society's annual meeting in Edinburgh.

The MAC system would have permitted two dozen individuals to use the machine virtually simultaneously, but there were only four other users when Dr. Wilkes gave his demonstration in Scotland because it was then between 4:22 A.M. and 5:24 A.M. in Cambridge, Mass. Dr. Wilkes was formerly at M.I.T. as a visiting researcher, and he communicated with the M.I.T. computer through a teleprinter in the auditorium where the British society was meeting. Closed-circuit television permitted everyone in the meeting room to see his console and his dialogue with the machine in the U.S.A.

The British General Post Office provided the telegraph link between Edinburgh and the cable switching office in London; Western Union International, Inc., supplied the transoceanic cable link from the British Isles to New York; and the Western Union Telegraph Company's Telex service completed the connection from New York to 545 Technology Square, Cambridge.

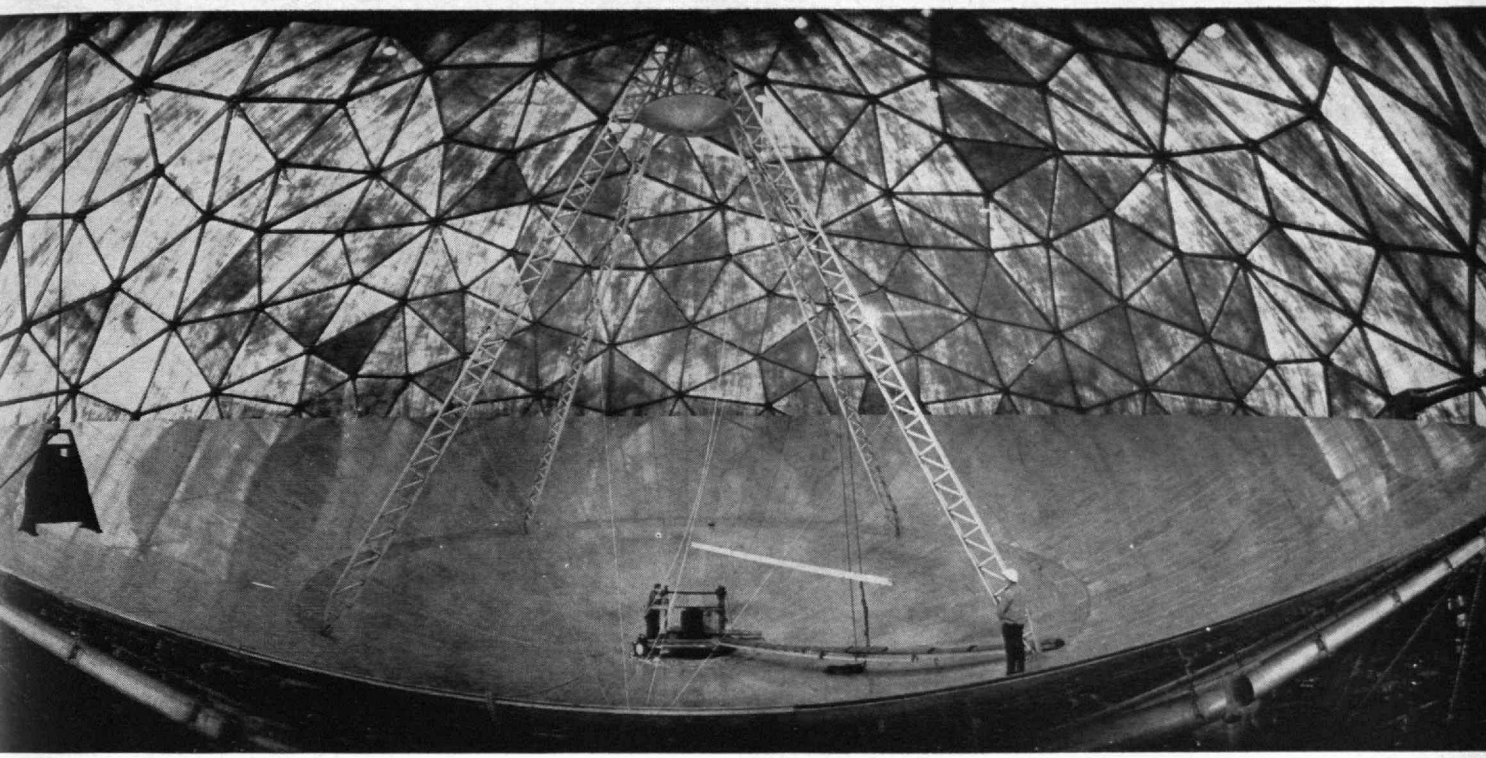
Dr. Wilkes was presenting a technical paper on time-sharing at the meeting overseas, and chose a small compound interest problem such as a bank might have for his demonstration. He wrote the computer program to solve it and typed it into the computer via the long-distance link. After then solving several hypothetical problems with this program, he made changes in it to show how conveniently he could edit it and continue working. He also demonstrated the use of an electrical filter design program that had been stored in the MAC computer's memory previously.

His messages to the machine were in FORTRAN, a machine language, but afterwards he typed out another message to MAC's Assistant Director, Richard G. Mills, '54, that read: "All this absolutely magnificent. Edinburgh computing conference sends warmest thanks to Project MAC for a most successful demonstration." To this, Mills replied: "It has been our pleasure . . ."

MAC is part of a national research program sponsored by the Advanced Research Projects Agency of the Department of Defense and supported at M.I.T. by the Office of Naval Research. "The MAC computer daily is in use simultaneously by numerous different people at remote consoles here in Cambridge," Professor Robert M. Fano, '41, said. "The only real difference in this case was that the wire to Dr. Wilkes's console was longer than usual."

That New City in Venezuela

THE M.I.T.-HARVARD Joint Center for Urban Studies will continue to participate for another two years in the development of Santo Tomé de Guayana, a city on the Orinoco, under a new contract awarded to it this spring by the development agency of Venezuela. Santo Tomé de Guayana is in a rich area and is expected to grow from a town of 60,000 to one of 500,000. The new contract will enable the Center to enlarge its research, advisory, and training programs.



THIS IS the 120-foot-diameter primary reflector of Lincoln Laboratory's Haystack Hill radio and radar research facility as it looked in early April, fully assembled and about to be adjusted to meet contour specifications which require that no point on the quarter-acre surface be more than 0.075 inch away from a perfect paraboloidal contour. Projecting from the center of the reflector is the barrel of an optical instrument specially designed to make the precision measurements needed in the final adjustment and evaluation of the reflector. In operation, the microwave feed horn will be located in the center of the large reflector, pointed up at the smaller secondary reflector which can be seen at the top of the photograph near the apex of the four-legged support structure. (The black object suspended at the left is a recording thermometer.)

This antenna system is the most precise large structure of its kind ever built. It was designed and developed jointly by North American Aviation, Inc., Columbus (Ohio) Division, and the Lincoln Laboratory, which originated the project and will operate and use the facilities once they have been completed this summer. It was fabricated and erected by North American under contract and sponsorship of the U.S. Air Force.

A Curb on Galloping

THE M.I.T. Aeroelastic and Structures Laboratory has been concerned for several years with the "galloping" of electric power transmission lines. When coated with ice on the windward side, a line behaves like an airfoil subject to lift and drag forces. Its vertical motion sometimes reaches many feet and results in costly damage.

One answer to galloping was arrived at through theoretical analysis, from which the researchers found they could predict changes in tension accurately. This ability suggested in turn that the energy associated with changing tension could be put to work to drive a device that would dissipate energy—causing the line to vibrate at an amplitude low enough to eliminate short circuits. A prototype damper developed in the laboratory consists of a gear box connected to a large drum filled with sand. As the power line insulators swing back and forth during galloping, the motion is transferred to the drum—in which the resisting motion of the sand is sufficient to extract kinetic energy from the galloping conductor.

The research was undertaken in 1959 for the Edison Electric Institute and a group of utility companies and equipment manufacturers. The anti-galloping device was field tested in 1961 at the Baltimore Gas and Electric Company test site, and in 1962 at the ALCOA test site.

Mimicry in Chess

A CHESS-PLAYING COMPUTER found checkmate in 40 per cent of a group of game situations chosen from standard texts and celebrated games, Herbert A. Simon of the Carnegie Institute of Technology reported in a Sigma Xi lecture at M.I.T. in April. The machine was programmed to simulate human decision-making processes, he said, and many of the problems were taken from famous examples of chess brilliance.

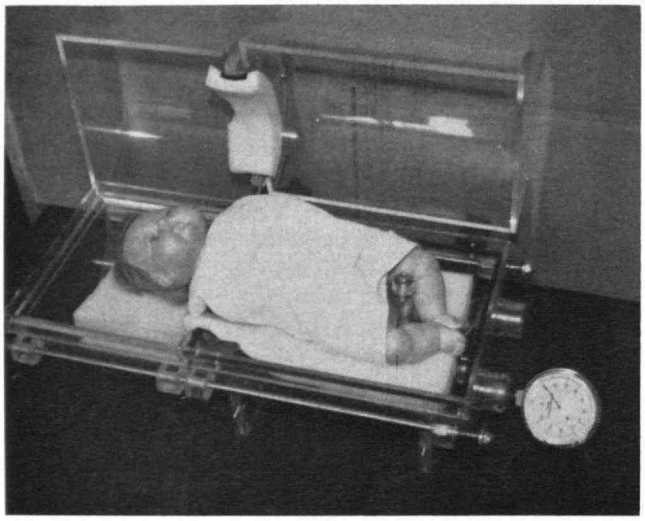
Dr. Simon has been using the computer as a tool in a quest for insight into human behavior. It can not only play good chess, he pointed out, but may also overlook solutions which human players have missed. In a famous game in which one player announced that he would mate his opponent in eight moves, experts later found a possible mate in seven. When given this problem, the computer mimicked the player and found the eight-move mate, but missed the other.

Development of the theory of information processing to explain human decision-making, Dr. Simon believes, will benefit neurophysiological study of the actual mechanisms of human understanding. His work does not depend on the computer or human "hardware," he said, but may yield results applicable to theories about both conscious and subconscious thinking.

The Big Day for Alumni

M.I.T. ALUMNI will begin registering at 8:30 A.M. on Monday, June 15, for a day of further education regarding the applications of modern engineering and technology to problems of human health. They will see great changes in the Institute's physical plant and hear President Julius A. Stratton, '23, describe its educational programs and plans. Many of the guests will have attended class reunions the preceding weekend, and there will be more fraternizing at intervals throughout the day, which will be concluded by a Boston Pops Orchestra concert in the Kresge Auditorium.

Three fellow Alumni now engaged in research at the Institute will give demonstrations repeatedly during the forenoon: Constantine J. Maletskos, '42, research physicist, will review recent progress in studies of radium poisoning; Associate Professor Edward W. Merrill, '47, of the Department of Chemical Engineering, will describe research in blood flow and pressure measurements; and Assistant Professor Philip A. Drinker, '61, of the Department of Civil Engineering, will demonstrate respirators for use in pediatric service that he and his



A doll in a servo-respirator for the newborn that will be demonstrated to Alumni and their wives on June 15.

students have been developing in co-operation with the Warren E. Collins Company and the Boston Lying-in Hospital.

In the afternoon, Dean Emeritus George R. Harrison of the School of Science will direct a discussion in which three eminent new members of the M.I.T. community of researchers will participate: Professor Hans-Lukas Teuber, Head of the Psychology Department; Professor Nevin S. Scrimshaw, Head of the Department of Nutrition and Food Science; and Dr. Lawrence Stark, Head of the Neurology Section in the Electronic Systems Laboratory. Under the heading of "Servomechanisms in Living Systems," they will report on such diverse subjects as the world's nutrition problems, the application of computers to the biomedical department, and the work of the new Department of Psychology at the Institute.

Luncheon will be served in tents in the Great Court, there will be a social hour on the West Mall following the afternoon program, and dinner will be served in Rockwell before the Pops Concert.

The Commencement Program

PRESIDENT JULIUS A. STRATTON, '23, will give the only address at M.I.T. commencement exercises this year. They will begin at 10:30 A.M., June 12, in the Armory, and be followed by a luncheon and reception in the Great Court.

Steven J. Glassman, '64, President of the graduating class, will moderate a discussion the preceding afternoon, at 2:30 P.M. in Kresge Auditorium, of "The Graduate's Role in Tomorrow's World." The speakers then will be Edward J. Hanley, '24, President of the Allegheny Ludlum Steel Company; Robert H. Winters, '33, President of the Rio Tinto Mining Company of Canada and former member of the Canadian Parliament; Howard O. McMahon, '41, President of Arthur D. Little, Inc., and Jerome B. Wiesner, Dean of Science at M.I.T.

The military commissioning ceremony will be at 10:30 A.M. on June 11, with Major General Alden K. Sibley, U.S.A., Commanding General of the U.S. Army Mobility Command, as the principal speaker.

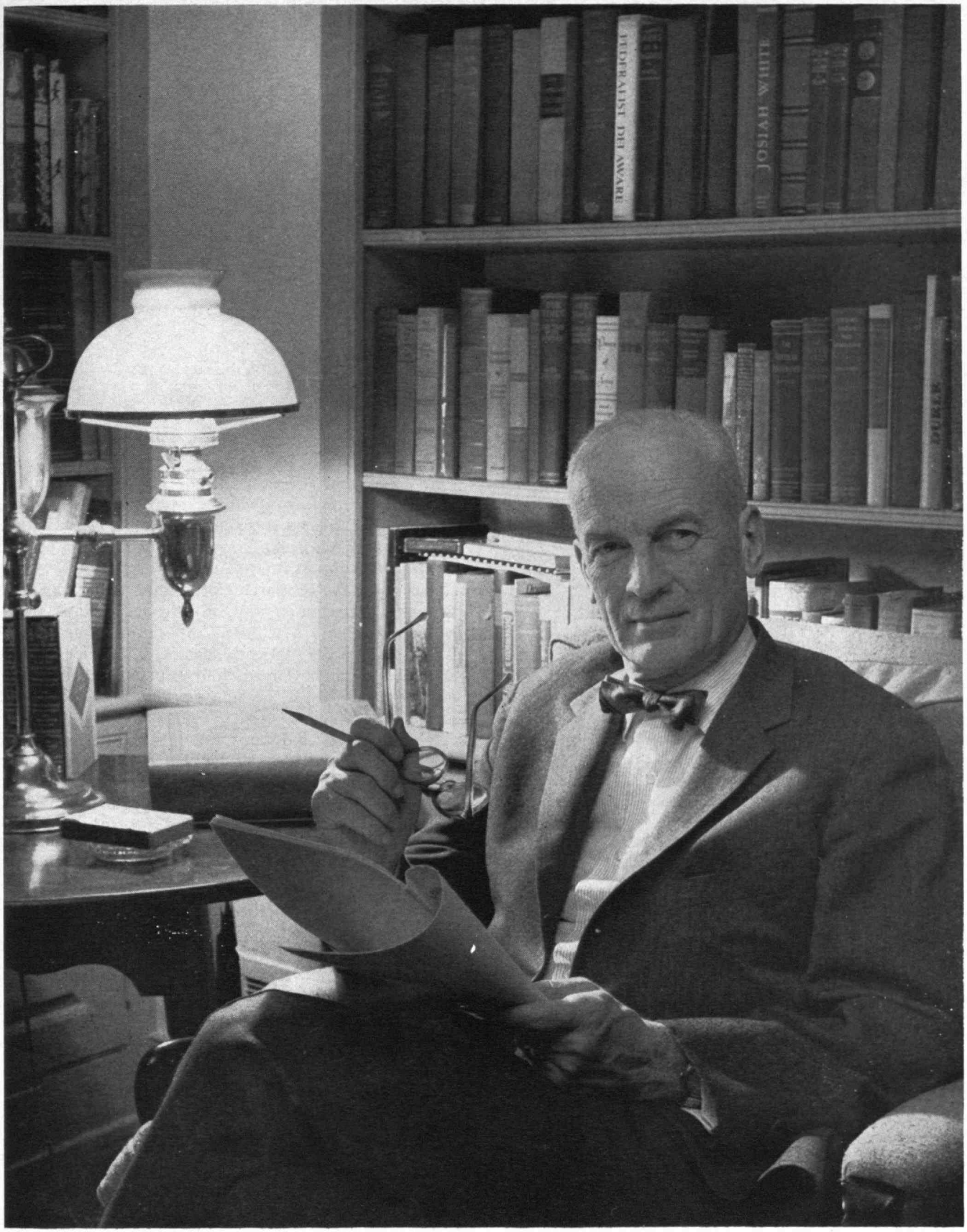
Protein, Calories, and Work

HIGH-CALORIE DIETS may be less desirable than high-protein diets for the efficient performance of strenuous physical work, according to Dr. Donald M. Watkin of the M.I.T. Department of Nutrition and Food Science. In a study conducted by Dr. Watkin and his associates last summer, 14 persons were put on special diets for 68 days. Part of the group spent two one-hour periods each day for 36 days walking a treadmill driven at four miles per hour and tilted at an 11.2 per cent grade. The data obtained suggested that the protein required for strenuous physical work is initially 70 per cent higher than the National Research Council's recommended daily allowance, and about 30 per cent higher after adaptation occurs.

The study, financed by the U.S. Army, is obviously applicable to the production of field rations for combat troops. A low-protein diet coupled with strenuous work can cause a shift in the heart's axis and a change in the activity of the heart itself. High-calorie diets are similarly disadvantageous. In addition to military applications, the data are pertinent to the food problem in underdeveloped countries where people work long hours in the fields and subsist on diets high in carbohydrates and low in proteins.

Dr. Watkin reported his findings at a meeting of the American Societies for Experimental Biology this spring. Although similar results have been obtained in Germany, Japan, and some countries in the Soviet bloc, his findings are the first of this kind obtained in the U.S.

Dr. Watkin became interested in such research at the National Institutes of Health in Bethesda, Md. He worked there with five adolescents who had incurable cancer, employing exercise on the treadmill as an anabolic stimulus in an attempt to prevent the breakdown of muscle and tissue which accompanies a tumor. In theory the exercise would increase the size of the muscles and the need for protein, robbing the tumor of necessary amino acids. In two of the five subjects a decrease in tumor activity occurred. Muscular contraction may also produce some agents with anti-tumor activity. If such an agent exists, Dr. Watkin would like to find it, isolate it, analyze it, and eventually synthesize it.



DONALD F. CARPENTER, '22, has been elected to be the 71st President of the M.I.T. Alumni Association, and will be at the head table at the luncheon in the Great Court on Alumni Day, June 15. Mr. Carpenter was the president of his class when graduated, and he is now a life member of the M.I.T. Corporation and a member of its Executive Committee.

This photograph of Mr. Carpenter in his home appeared in Better Living *this spring when his retirement as the general manager of the Film Department of E. I. du Pont de Nemours and Company was announced. Mr. Carpenter started with Du Pont in 1922 and served the firm in numerous positions, including the vice-presidency of the Remington Arms Company.*

The Forrester Computer Memory

SETTLEMENT this spring of litigation involving a patent obtained by Professor Jay W. Forrester, '45, in 1956 will bring M.I.T. the largest sum that it ever has received from patent rights for enrichment and expansion of its educational program.*

Professor Forrester, who is now on the Faculty of the Alfred P. Sloan School of Management, was a research engineer in the M.I.T. Digital Computer Laboratory in the 1940's when the Whirlwind computer was developed on behalf of the Office of Naval Research and the U.S. Air Force. A bottleneck in computer design which became clear then was the internal memory system, and Professor Forrester had the idea in 1949 that made it possible to meet the rigorous requirements of computers used to process air defense information.

This idea was to make a memory system with magnetic cores capable of bistable operation through the use of materials having nearly square hysteresis loops and electrically exciting them by coincident currents. Each core was to be doughnut-shaped, have wires through it, and have a magnetic flux either clockwise or counterclockwise, so as to store a single binary digit of information which could only be changed by passing pulses of current through two of the wires at the same time. These cores were to be arranged in columns and rows to form planes, and the planes arranged in a three-dimensional stack, so that a large number could be arranged in a small space. The use of cores for computer memories had been suggested earlier but without the features of coincident-current excitation.

The first core memory systems embodying Professor Forrester's idea were built at the M.I.T. Digital Computer Laboratory, which was combined with several other groups to form the Lincoln Laboratory in the early 1950's. Further development of the cores followed at Lincoln and elsewhere, and they are now used in nearly all large computers.

Professor Forrester filed a patent application on the core memory system and assigned it to the Research Corporation, a nonprofit organization devoted to handling inventions made at universities. This was done in accordance with a long-standing agreement with Research Corporation which provided that a part of the proceeds from commercial use of the invention were to be paid to Professor Forrester and a part to M.I.T. The Institute recognized then and still does that an inventor should participate in the proceeds of any income from his invention.

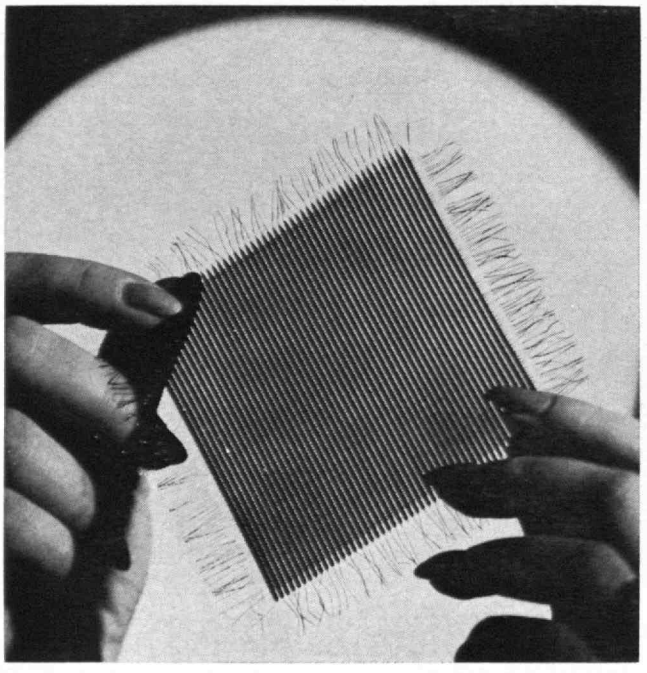
In keeping with the standard policy of the Department of Defense, a royalty-free license was granted to the United States government, whereby the government could make or purchase core memory systems without payment of royalty.

In the Patent Office, Professor Forrester's inventorship was contested by Radio Corporation of America, which also had filed a patent application describing a form of magnetic memory system. This contest reached the United States District Court in New York City in a suit between the Research Corporation and RCA. The Research Corporation also brought suit against International Business Machines Corporation, charging infringement of the Forrester patent, and when M.I.T. and the Research Corporation terminated their agreement in 1963, M.I.T. became a party to both the RCA and the IBM suits.

These complicated cases were ended by a series of settlements entered by Judge E. J. Dimock of the United States Court in New York. The litigation against RCA was terminated by a consent judgment in which Professor Forrester's position as inventor of the coincident-current core memory was established, and the suit against IBM was terminated by a license granted by M.I.T. to IBM. In that license, IBM elected to pay M.I.T. a lump sum and a figure of $13,000,000 was negotiated. Under the agreement with RCA and M.I.T., RCA will use the invention under a combination of royalty-free and royalty-bearing licenses, depending on the use.

Alumni participating in the settlement negotiations as attorneys were Melvin R. Jenney, '21, and Robert J. Horn, Jr., '44.

*Net revenue to the Institute from patent royalties has not been as large as some persons have supposed; less than $2,000,000 accrued to it from its patent program from 1932 to 1963.



A COMPUTER memory plane with 2,000 storage cells per square inch has been produced experimentally by a molding process that IBM researchers, including James M. Brownlow, '44, described this spring.

Another Journal

VOLUME 1, Number 1, of *Surface Science*, a quarterly journal to deal exclusively with fundamental theoretical and experimental studies in the physics and chemistry of surfaces, has been issued by the North-Holland Publishing Company of Amsterdam. Professor Harry C. Gatos, '50, of M.I.T. is its editor, and notes in this issue that although he and his associates find the rate at which new journals are appearing is staggering, they are convinced that they are "fulfilling a need rather than following a trend." Walter W. Harvey, '52, is a regional editor, and the new journal has other regional editors in France, England, and Germany. It will be published mainly in the English language.

PARENTS' WEEKEND Chairman Robert L. Blumberg, '64 (at right) introduced his father, William T. Blumberg, at a dinner in Walker Memorial. Between them is William Samuels, '65, Undergraduate Association President. Chemical and Engineering News *honored the younger Mr. Blumberg as one of 1964's outstanding seniors.*

The Alumni Seminar in September

THE NATURE OF MAN will be the theme of the three-day seminar now being arranged for M.I.T. Alumni and their wives next September 12, 13, and 14.

Mindful of the pace of our culture, the Alumni Seminars Committee intends the program to be a serious effort to impart specific knowledge to a group of thoughtful adults, on subjects in which recent advances have outdated the formal education of many. Man and his universe, the workings of his mind, and his moral and spiritual accomplishments will be discussed.

Professor Harlow Shapley of Harvard, whose lecture was one of the outstanding features of the first seminar of this type last year, will again be one of the 15 teachers and discussion leaders. Others will include Professors Richard M. Held, Walter A. Rosenblith, and Huston Smith. The destiny of man will be the final topic, and Honorary Chairman Vannevar Bush, '16, and Chairman James R. Killian, Jr., '26, will be members of the panel of scholars assembled for this session.

Participants will be asked to prepare themselves by previous reading which will be sent to them, and given ample opportunity to question the seminar leaders. Attendance must be limited to those who can be housed on campus; the fee, including meals, dormitory rooms, and all sessions will be $75 per person.

City and Social Planning

M.I.T. and Brandeis University will co-operate in conducting a seminar on "Urban Policy and Social Planning" for graduate students of both institutions next September. Professor Robert Morris of Brandeis and Assistant Professor Bernard J. Frieden, '57, of M.I.T. will be in charge, and research methods and planning techniques of common interest to city planners and social welfare planners will be emphasized.

A Show for Parents

M.I.T. BECAME a scientific and cultural supermarket replete with displays, lectures, and dramatic presentations last April 24 to 26 for Parents' Weekend. More than 950 parents attended. Professors Hans Mueller, Warren M. Rohsenow, and Hans-Lukas Teuber gave special lectures, and students gave special demonstrations.

Artificial quicksand manufactured by the Department of Civil Engineering disproved the notion that a person inevitably sinks to the bottom of a quicksand pool. Cross sections of concrete showed the hidden beauty of multicolored chunks of gravel embedded in the cement. A computer manipulated spaceships through a space war, and many were startled to see a sponge-rubber ball, frozen in liquid nitrogen, shatter when thrown against a wall.

Magnetohydrodynamics Symposium

ENGINEERING aspects of magnetohydrodynamics (MHD) were pondered during the Institute's spring vacation week by 350 engineers and scientists at a symposium sponsored by the American Society of Mechanical Engineers, the Institute of Electrical and Electronics Engineers, the American Institute of Aeronautics and Astronautics, and M.I.T.

G. Sargent Janes, '53, of the AVCO-Everett Research Laboratory was general chairman; Associate Professor Jack L. Kerrebrock was program chairman, and Assistant Professor William H. Heiser, '62, was arrangements chairman. Alumni participants included Robert V. Hess, '39, James A. Fay, '47, Lawson P. Harris, '50, George A. Brown, '51, William T. Lindsay, Jr., '52, Charles H. Kruger, Jr., '56, Bruce R. Hayworth, '59, Charles H. Marston, '59, Bert Zauderer, '60, and Michael H. Reid, '62.

(The Trend of Affairs is continued on page 56)

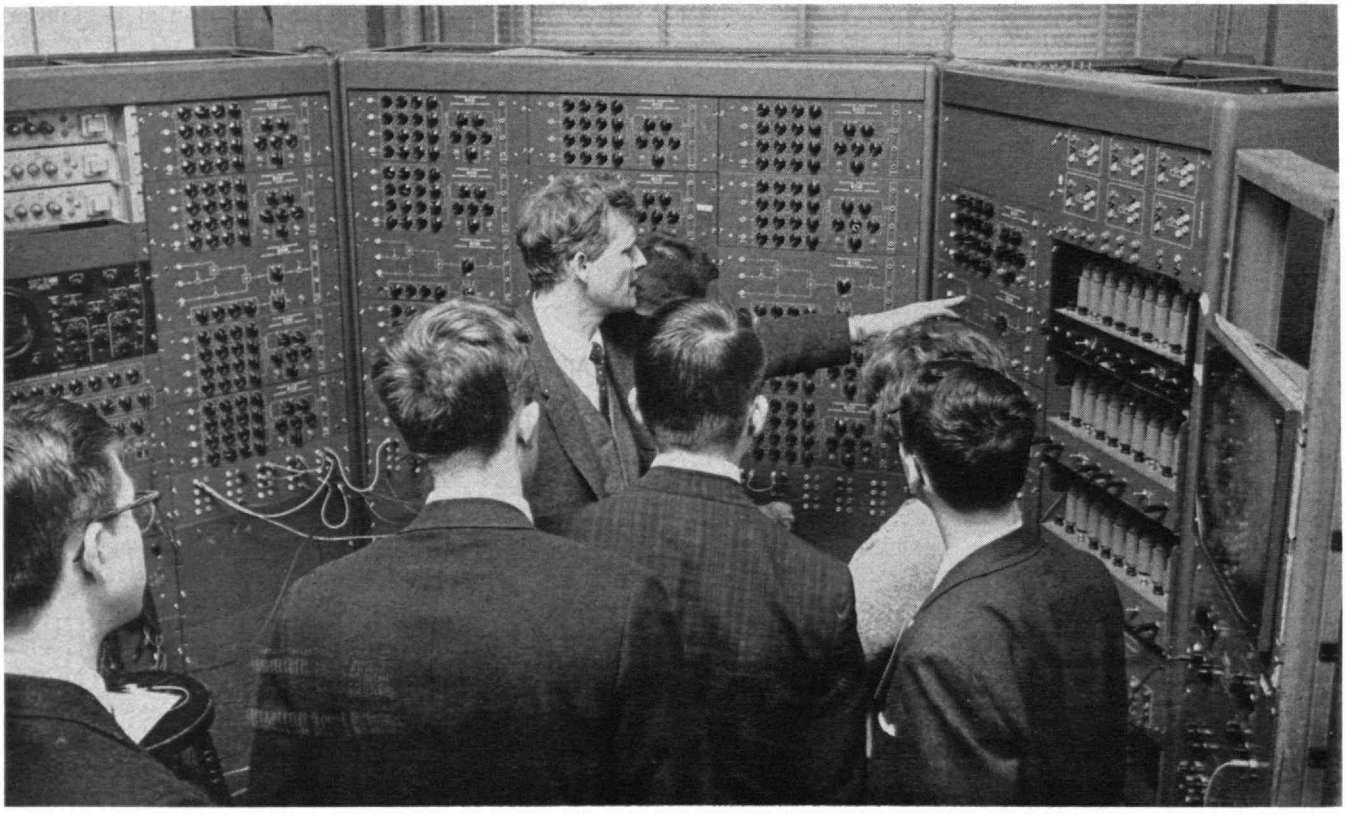
High School Juniors See the Institute

HIGH SCHOOL juniors and their teachers from the Greater Boston area attended—and took part in—a two-day Science and Humanities Seminar planned by M.I.T. students this year, that many of the Institute's most noted teachers addressed.

Fifteen of the young visitors and four M.I.T. undergraduates presented papers on their own research ventures. All got an intensive, first-hand look at current university research and representative laboratory techniques, and an opportunity to question a panel of professors about careers in science and engineering.

Cosponsors with M.I.T. were the International Business Machines Corporation, the U.S. Army Research Office, Massachusetts State Department of Education, and the U.S. Army Materials Research Agency.

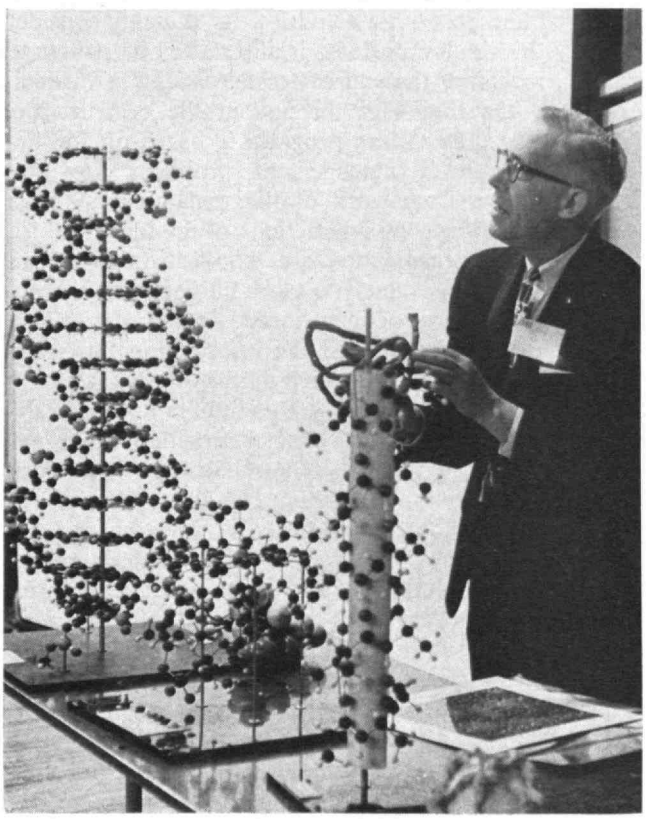
Vannevar Bush, '16, was keynoter; Richard McDowell, '60 (in center), administrative co-ordinator, and Mark Hanson, '65 (at right) chairman.



Henry M. Paynter, '44, Associate Professor of Mechanical Engineering, explained the operation of an analog computer during the students' tours of M.I.T. laboratories. All guests were selected because of interest shown in science.

Solving a freshman problem in transistor circuitry delighted David Hawkins, a Sharon High School student. At left is Campbell L. Searle, '51, Associate Professor of Electrical Engineering, one of the Faculty participants.

Professor John Wulff shared some of the pleasures of metallurgical work with the visiting high school students.



And Professor Irwin Sizer described biological research with models that a teacher of contemporary art might envy.

Research & Development Policy-Making

A computer can be used to study the effects of a company's policy on the fate of a project

BY EDWARD B. ROBERTS, '57
Assistant Professor of Industrial Management at M.I.T.

THE potential impact of research and development policies necessitates the development of a new approach to the design and testing of managerial ideas. In engineering and scientific laboratories, wind tunnels, ship-towing tanks, scale models, pilot plants, analog and digital simulators are used to check plans and ideas for flaws before any mistake can produce serious consequences. Can similar techniques be found for improving the management of research and development?

To erect a new building, one needs a plan, the tools and materials, and skilled artisans to carry through the construction. In an analogous fashion, the development of a management policy laboratory for R and D requires a conceptual framework, tools and materials for filling in that frame, and able and interested R and D managers and researchers.

The Industrial Dynamics research program started at the M.I.T. Sloan School of Management seven years ago by Professor Jay W. Forrester, '45, has provided the basis for a plan of attack. Industrial Dynamics emphasizes the information-feedback characteristics of all industrial and economic activities. Its students consider the ways in which a business is affected by its structural aspects, including the sources of amplification in decisions and the time lags throughout the organization. The Industrial Dynamics program is based on the belief that top-level management problems are best viewed from a framework of the dynamic system in which the time-varying interactions of the industrial (or governmental) organization are manifested. Hence an Industrial Dynamics analysis takes into account the underlying basic flows of men, money, materials, orders, and capital equipment, and the information flows and decision-making network which tie the others together.*

An Industrial Dynamics study requires a specific dynamic theory of cause-and-effect interaction which encompasses the problem of interest. Such an hypothesis is now available for describing the life cycles of research and development projects. A research and development project consists of a set of underlying activities which continuously interact to produce the project history. The resulting actions continuously feed back upon the other decision areas of the project to induce further changes. This closed-loop system of activities is pictured on the opposite page.

The changing world situation continuously alters the need for new products (military, industrial, and consumer). Technological capabilities for obtaining them change, too. Both the potential customers and the firms that develop new products are continuously engaged (consciously or unconsciously) in activities aimed at foreseeing the market for them, and the technological feasibility of the product development effort. The manpower, materials, facilities, and equipment that will be needed must be estimated, and an attempt made to judge the total cost of the program.

The research organization then has two choices: It can submit a request to its potential customer for financial support, or invest its own money in the project. If a customer reacts favorably to a request for support, he may commit funds to the project, but not until after a long delay. The alternative involves risk to the R and D group should it elect to commit its own funds before the customer makes such a commitment.

When the project group obtains funds, it begins to hire or reassign engineers and supporting manpower. Their rate of progress then reflects, among other factors, the magnitude of the manpower effort, the technological state of the art, managerial influences on productivity, engineering experience on the project, and inefficiencies resulting from organizational growth. Both the customer and the firm continuously attempt to assess the progress. These measures lead to new estimates of the work yet to be done, which feed back into the closed-loop process. New evaluations are continuously made by the R and D organization, as to its appropriate investment rate in the project, and by the customer, as to possible modifications of the project programming and support.

This continuing cycle of activities goes on until the job is completed or canceled. Changed estimates and evaluations may appear formally only in periodic reports, but the increments of progress and change, real and observed, take place continuously. On-time or late completion, customer stretch-out or acceleration of the project schedule, satisfactory performance or job cancellation, can all result from the system interactions. These various results, and the system which underlies them, are observable both in government-sponsored research and development projects and in programs to develop new commercial products. Thus the dynamic system structure shown in the drawing can be applied to investigation of managerial policies in all forms of R and D.

With this framework, an R and D management laboratory can represent research and development organizations effectively and modify the represented structure and policies experimentally. The Industrial Dynamics

*See Jay W. Forrester, *Industrial Dynamics* (The M.I.T. Press, 1961); and Roberts, "Industrial Dynamics and the Design of Management Control Systems," *Management Technology* (December, 1963).

program has developed the methods for describing such structures and policies in a management-oriented language suitable for computer interpretation.

Once represented, the effects of alteration of the parameters and policies can be studied with the DYNAMO digital computer simulation system.† DYNAMO is an automatic compiler and simulator for the IBM 704, 709, 7090, and 7094 computers which makes easy and inexpensive the multiple simulation runs that are required. The computer system permits valuable payoff by making the feedback of theory-test-results-theory more immediately available, thus allowing redesign of hypotheses and gradual synthesis of the findings.

Our management laboratory approach to the design of more effective R and D policies now has a framework and the tools and materials to put on the frame, but craftsmen to carry out the job are still needed. Some farsighted R and D managers have begun preparing themselves for this new managerial role, and several members of the M.I.T. Sloan School of Management's Program in Executive Development have taken first steps to develop capabilities in this approach. The researchers in these areas have come from responsible management positions in such companies as RCA, Boeing, IBM, Hughes, and Chrysler, as well as government agencies such as the Air Force and the Navy.

R and D managers whose engineering backgrounds include servomechanisms, chemical process controls, or electronic information-feedback systems are ideally suited to undertake Industrial Dynamics studies. Their engineering experiences have given them strong intuitive grasps of the nature of system behavior and of principles of systems design. Many of these men have carried out simulation studies with physical systems and are aware of the insights to be gained from carefully thought-out and executed model simulations. As managers they also have tackled (and often been confounded by) the complexities of R and D management. Thus they come prepared with an understanding of both the methodology and the problems. What they require is the encouragement of a top management willing to exercise the same patience with managerial policy design as with physical product design.

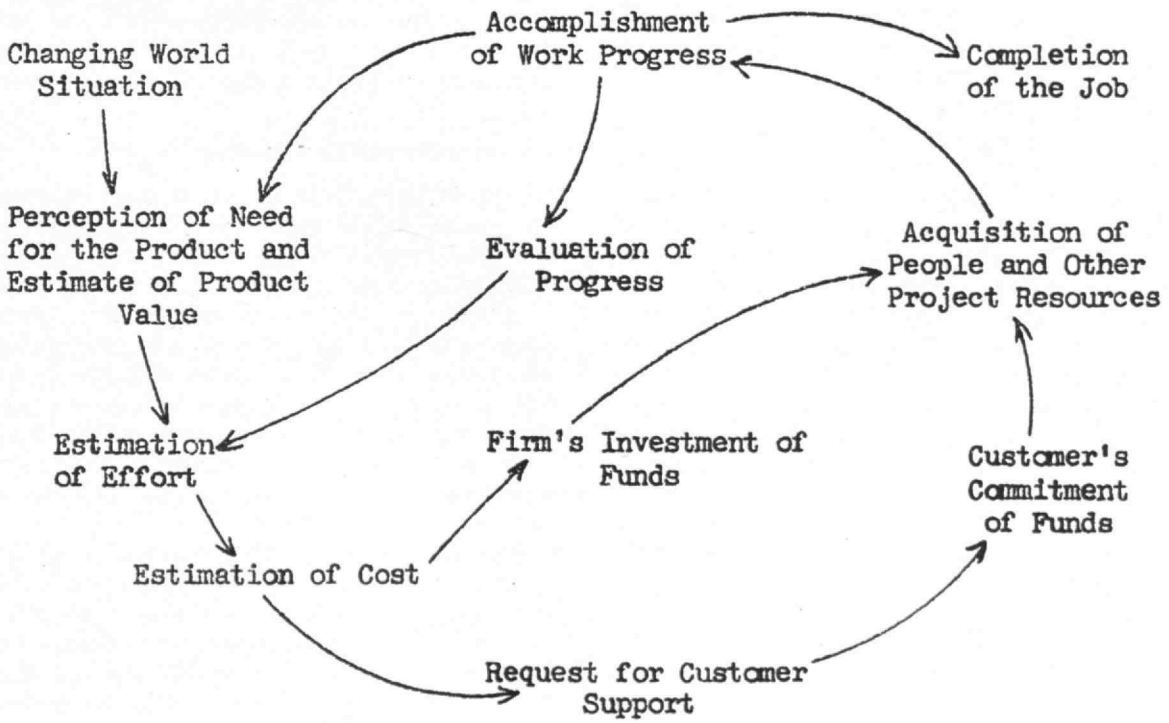
†Alexander L. Pugh, 3d, *DYNAMO User's Manual,* 2d edition (The M.I.T. Press, 1963).

Some Model Tests

To demonstrate how the proposed laboratory approach might work, we have added a set of specific hypotheses to the initial dynamic systems framework (that is pictured below), and from these have developed a policy-oriented model for studying project management problems. It is not really important at this point whether or not every hypothesis is completely validated by data collection and analysis. Alternatives based upon a particular set of experiences might be offered to any of our hypotheses. What is important is that the general usefulness of the laboratory approach to policy design be demonstrated. The assumptions made in the model are based on the literature, personal experience in research and development organizations, and discussions with many managers.‡ Each organization would need only to change the model to make it descriptive of its own experiences and problems.

The completed model of research and development that we have simulated on a digital computer contains about 250 variable equations and an additional 135 constants and initial conditions. These describe the causes of both the customer's and the firm's actions as well as the characteristics of the product. Calculation of the values of these equations at successive time intervals produces the life cycle of the project simulated.

‡Full development of the model, the theory underlying it, and the results of extensive simulation investigations are provided in Roberts, *The Dynamics of Research and Development* (Harper and Row, 1964).



Alteration of any system parameter or policy produces changes in the project life cycle which can be detected in a simulation study.

A typical project history simulated in the M.I.T. Computation Center is one requiring from 600 to 3000 man-years of engineering effort, depending on the state-of-the-art advances which can be utilized and the overall ability of the firm's management and engineers. The cost is expected to be between 18 and 90 million dollars, a range covering such projects as an air-to-air missile for the Air Force, a scientific satellite system for NASA, an airport traffic radar-control center for the Federal Aviation Agency, or a new type of nuclear power station for a western utility. It is a project of the type in which the relevant technology is rapidly advancing, the need for the product is changing, and both the firms and customers involved have earlier experiences with each other and with similar kinds of undertakings.

The project history is pictured from several points of view at the top of the next page. The curves are outputs of the computer simulation, generated by the interactions of the modeled policies of the customer and firm. The graphed data correspond to our general notions about the dynamic behavior of research and development projects. For example, the cycle of the product value phenomenon is clearly visible: The intrinsic product value, which is the principal input to the model run, grows, levels off, then falls gradually to zero; in partial response to this, the recognized current value of the project lags the real value throughout the life cycle; the estimated future product value lags at first, then rapidly advances, overshooting the real value by a large factor, finally falling back toward zero. This relationship between the behaviors of real and believed product values is an important characteristic of many projects.

Another vital phenomenon is the changing curve of estimated project cost. Starting very high relative to product worth at that time (lack of technical feasibility implies infinite costs), the estimated effort and cost on the project gradually fall with the rising state of the art. As expected costs fall, and perceived product value rises, the firm hires (or assigns) more engineers to the project. When the cost estimate is sufficiently low relative to anticipated value to attract the customer's support, the project moves into a full-scale development program. The resulting increase in engineering effort tends to stabilize the earlier decline in estimated cost as the firm begins to form a more realistic impression of the magnitude of the job and the effectiveness of the engineers. Cost estimates gradually rise during the rest of the project's life, with final costs about 20 per cent greater than those expected during the early growth phase of the project.

The curve of engineering employment is also interesting. For a long time only a single engineer is working in the product area. Then the curve rises gradually as the firm invests more of its own funds. When the project receives customer support, the staff grows steadily and ever more rapidly until it nears completion. The more jagged curve of applied engineering effort takes into account the usual holidays, vacations, and absenteeism. This closely resembles the fluctuating curves of engineering effort well known to R and D project managers.

As you would expect, the curve of real cumulative per cent completion is hardly visible for many months. Only as the project activities enter their early growth phase does project accomplishment begin to appear on the graph. In part, this is misleading. For much had already been accomplished prior to the period charted. The engineering staff had been increased to form a nucleus for the project expansion; cost estimation on the project had been firmed up; and funds had been allocated by the customer. These achievements were all vital to the project, but none of them can be directly related to the elements of engineering needed to finish the product development. They took place before the large expenditures of effort or funds which characterized the "formal" beginnings of the project. Managers and researchers who ignore the existence of this earlier phase of a life cycle are forgetting the very sources of the entire project concept and execution.

From month 100, the project engineering tasks were gradually accomplished, and the per cent completion rises correspondingly. About 80 per cent of the effective work was done in the last 18 months of the project. The work was actually completed in month 122 and some extras added while the engineers were being transferred from the project.

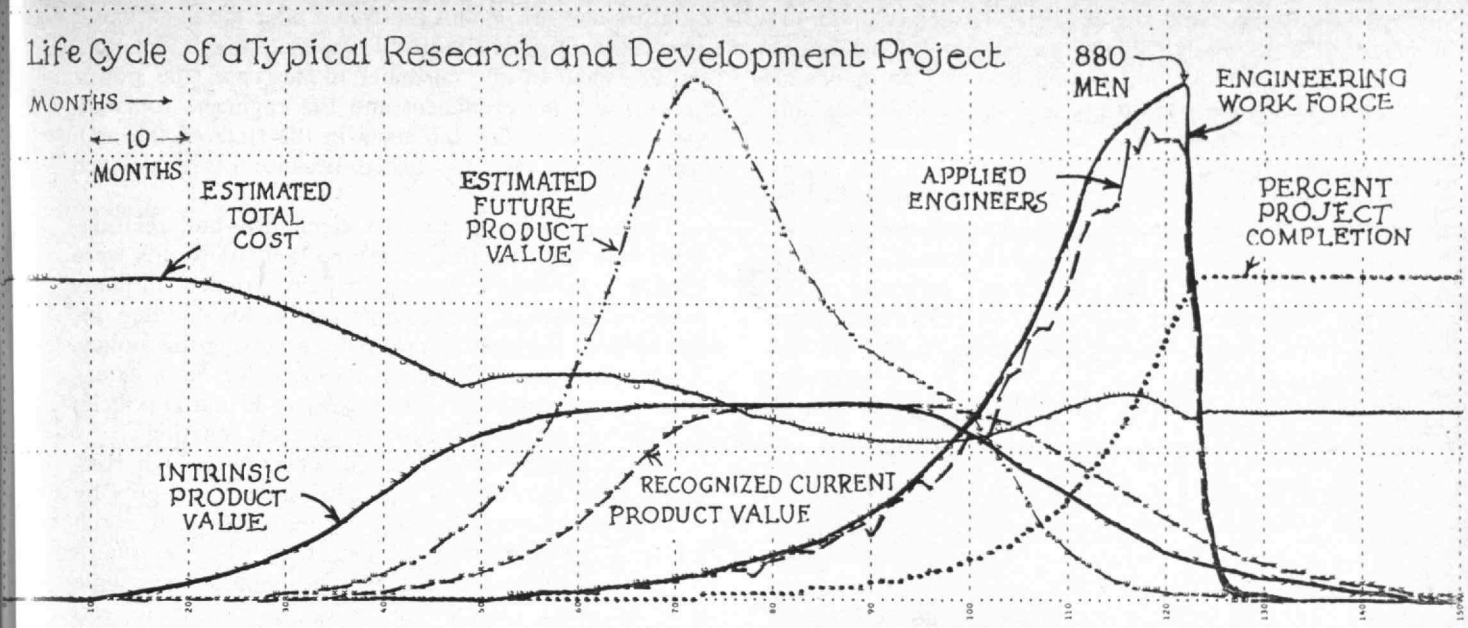
Prior to month 100, by which time full-scale activities were under way, only about 300 cumulative man-years of engineering effort had been invested out of the 1,395 man-years ultimately needed for completion. From that time, an additional two years were needed to finish the project work. When the job was finally completed, the customer was dissatisfied, feeling that the costs had exceeded the product value and that the product was no longer particularly useful. Such has often been the case in both military and commercial research and development undertakings.

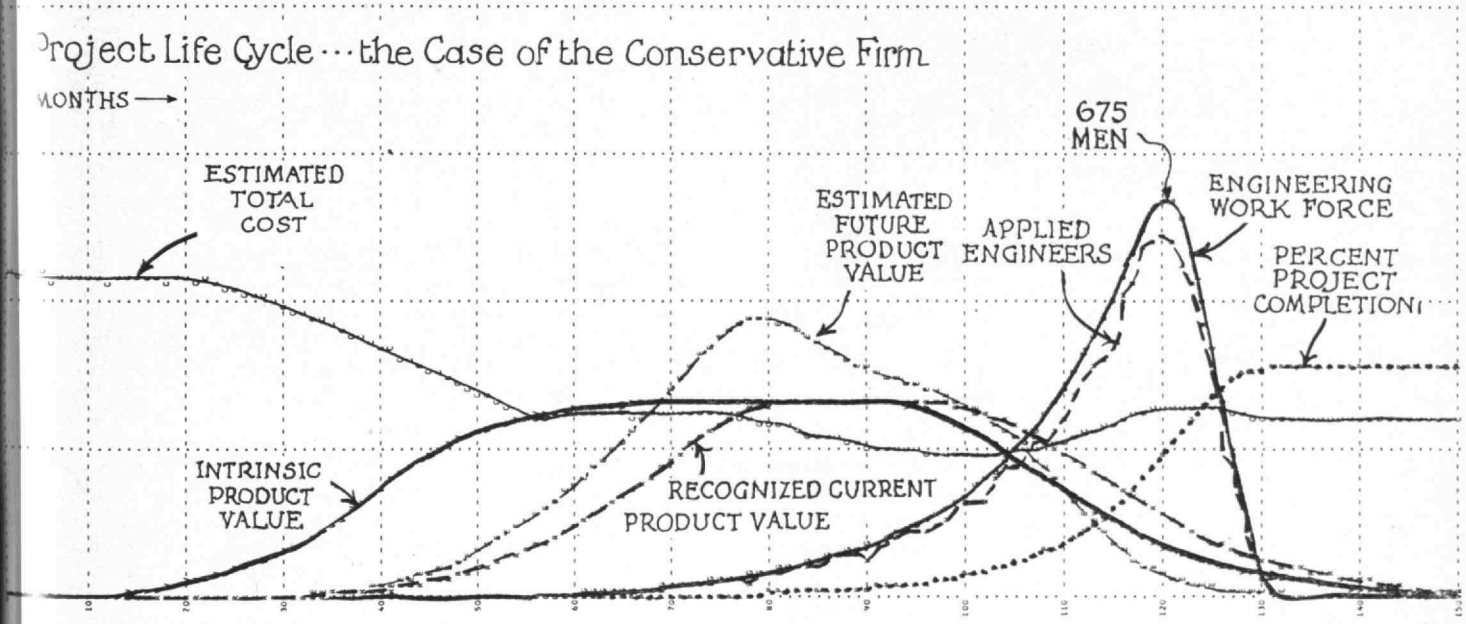
The computer results demonstrate the plausibility of the hypothesized model. More important they indicate that with such a model (or with an alternate model, if preferred), R and D managers can begin to determine experimentally the effects of changes in characteristics of the product, customer, or firm, or in the policies of the customer or firm. Some results of such simulation experiments with the model will now be described.

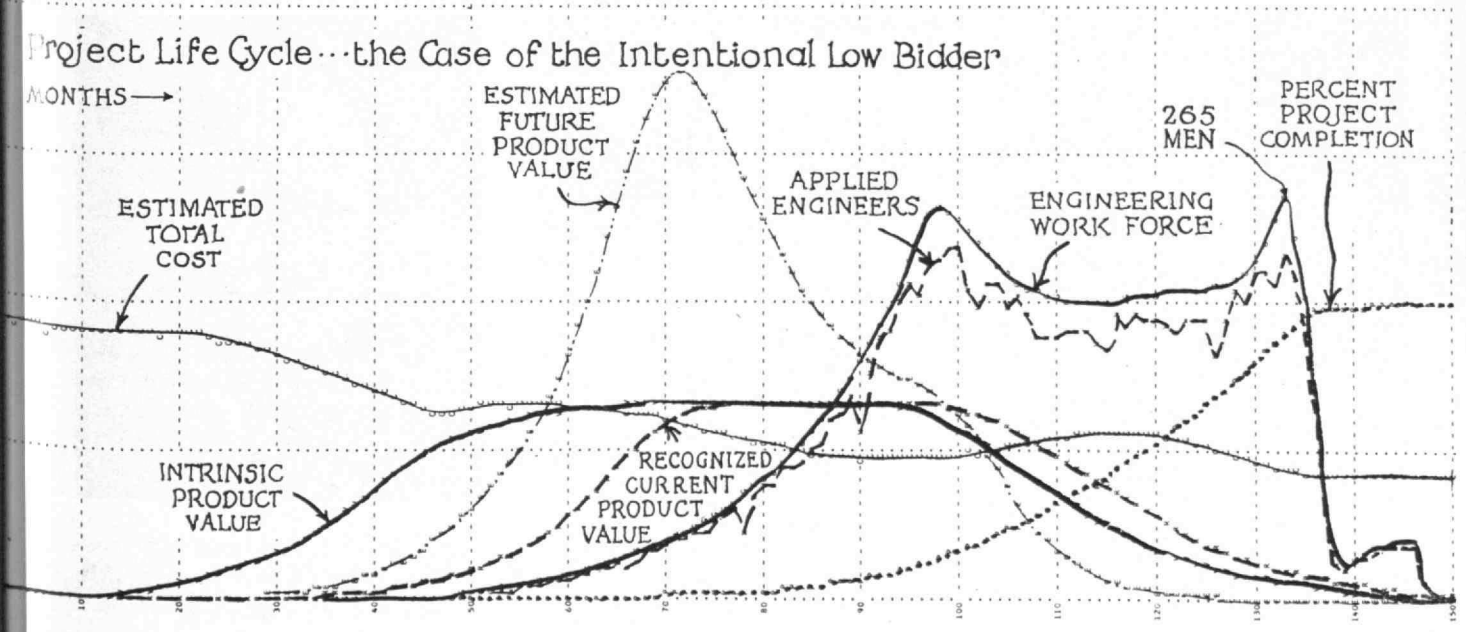
Conservatism and Low Bidding

Disappointments in R and D often are blamed on the complexities of the product, rapid changes in technology, the competitive situation, or faults in customer planning or decision-making. Such factors are significant. However, the policies and practices of organizations actually doing the research and development work also vitally influence the success or failure of a project. For example, the firm's relative optimism or pessimism, its speculativeness or conservatism, biases its estimates of future product value, technological progress, and engineering effectiveness, and influences the firm's investment of its own funds.

The firm involved in the project pictured at the top of the next page had a high risk-taking propensity. To illustrate the effects of conservatism on project dynamics, the basic simulation was rerun, with the hypothesis that the modeled firm was conservative instead of speculative. The new results are shown in the center of the


Life Cycle of a Typical Research and Development Project
MONTHS
10
MONTHS
ESTIMATED TOTAL COST
ESTIMATED FUTURE PRODUCT VALUE
880 MEN
ENGINEERING WORK FORCE
APPLIED ENGINEERS
PERCENT PROJECT COMPLETION
INTRINSIC PRODUCT VALUE
RECOGNIZED CURRENT PRODUCT VALUE


Project Life Cycle ··· the Case of the Conservative Firm
MONTHS
ESTIMATED TOTAL COST
675 MEN
ESTIMATED FUTURE PRODUCT VALUE
APPLIED ENGINEERS
ENGINEERING WORK FORCE
PERCENT PROJECT COMPLETION
INTRINSIC PRODUCT VALUE
RECOGNIZED CURRENT PRODUCT VALUE


Project Life Cycle ··· the Case of the Intentional Low Bidder
MONTHS
ESTIMATED FUTURE PRODUCT VALUE
ESTIMATED TOTAL COST
APPLIED ENGINEERS
ENGINEERING WORK FORCE
265 MEN
PERCENT PROJECT COMPLETION
INTRINSIC PRODUCT VALUE
RECOGNIZED CURRENT PRODUCT VALUE

page (with the same set of scales as before) and the changes are obvious. This firm's estimate of the future value of the product was much lower. This made the project less attractive: the conservative firm was unwilling to risk as much of even these expected profits, and waited instead for the customer to provide financial support. This policy retarded the acquisition of an engineering team, contributed additional delay to the customer's funding, and significantly slowed progress. By month 122, the project had been completed in the earlier simulated case; by month 122 in this case, however, the customer had become so dissatisfied that he cut back on funding, and by month 130 the engineering on the job came to a halt with only 75 per cent of the task completed.

Thus in this particular case the firm's policy of conservatism actually caused the failure of the job and the waste of the 34 million dollars that the customer spent on the effort. Under other project circumstances, of course, the conservative approach may be the more advisable policy for the firm to adopt. The power of the Industrial Dynamics approach is that it permits study of the likely results of various policies.

At times company "optimism" is so extreme, particularly with respect to cost and effort estimates, that R and D proposals really reflect intentional low bidding. Many companies are led to underestimate project costs in their attempts to get R and D contracts. Under traditional Cost Plus Fixed Fee (CPFF) contracts, the firm is not directly penalized for the resulting overruns on project costs. However, as the case at the bottom of page 35 illustrates, the firm's policy of intentional cost underestimation has significant effects on project dynamics, and through them on the firm and customer, too. The simulated project life cycle pictured last evolved from the basic situation portrayed first, the only change being in the degree of integrity of the firm, affecting the cost estimates it submitted to the customer.

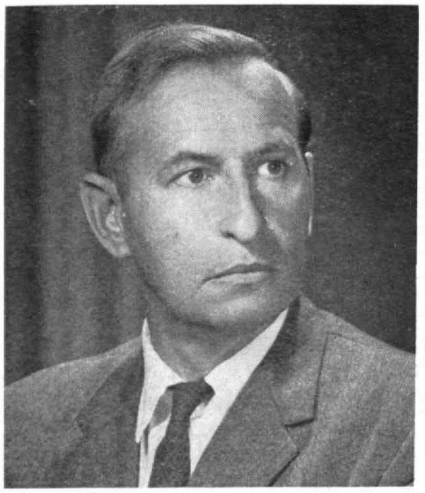
The smaller initial contract size induced by the low bid caused a rate of engineering effort much lower than really needed. This led to a considerable stretch-out of the project, with attendant fluctuations in the size of the engineering effort. The project finally was completed at month 145, about two years after the completion date of the original simulated project. Though less money was spent by the customer in this case (the slower growth was more efficient and the engineers took advantage of later developments in the state of the art), the customer was dissatisfied because of its delayed completion.

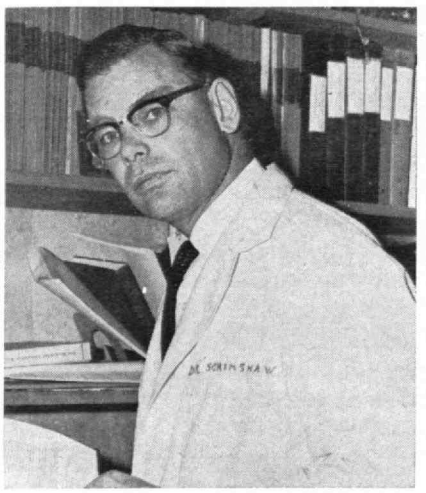
The firm suffered, too: Its reputation and relationships with the customer worsened, and its profits were slightly lower than in the original case studied. In many projects, however, the company with low-bidding integrity does increase its profits by following this policy. Again, these results highlight the need for more extensive management laboratory studies of R and D policies in different company-customer-product situations.

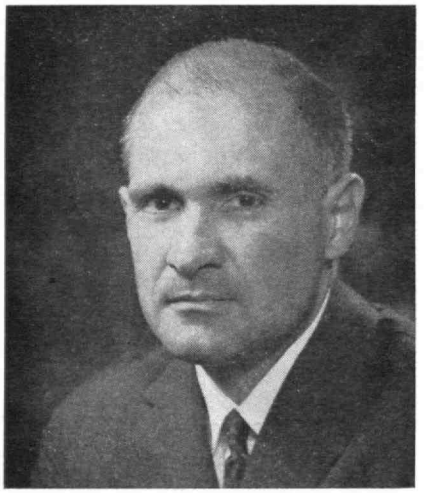
The computer results demonstrate that a high risk-taking propensity as well as a high degree of integrity by the firm very favorably affect the outcomes of research and development projects, i.e., from the customer's point of view. Greater company willingness to assume risk and invest in potential projects, for example, gets jobs finished sooner and pushes progress to a further point even for projects which are eventually canceled. Under existing government contracting practices, however, neither high risk-taking nor high integrity is directly profitable to the firm. The company assuming greater risks almost always suffers, at least in the short run; the company exercising greater honesty in bidding reduces its individual project profits as often as it gains.

Still unpublished empirical data collected by the author on a number of R and D projects support this theoretical finding. Thus the policies followed by the government seem to influence companies to adopt practices which are counter to the government's best interests. A changed philosophy, matched by revised procurement policies, could both benefit the R and D companies and the government.

A management systems laboratory offers great potential as a means of studying the design of improved R and D policies. Even a small gain in effectiveness so achieved would mean annual cost savings or performance improvements in the order of hundreds of millions of dollars.







ALUMNI DAY SPEAKERS, at M.I.T. on June 15, will be (from left) Drs. Hans-Lukas Teuber, Nevin S. Scrimshaw, and Lawrence Stark, who will discuss, respectively, advances in psychology, nutrition, and neurology during a program moderated by Dean Emeritus George R. Harrison of the School of Science.

A 2-Man Submarine for Research

Woods Hole Institution prepares to test a vehicle sturdy enough to go down 6,000 feet, yet light enough to sit on a ship's deck

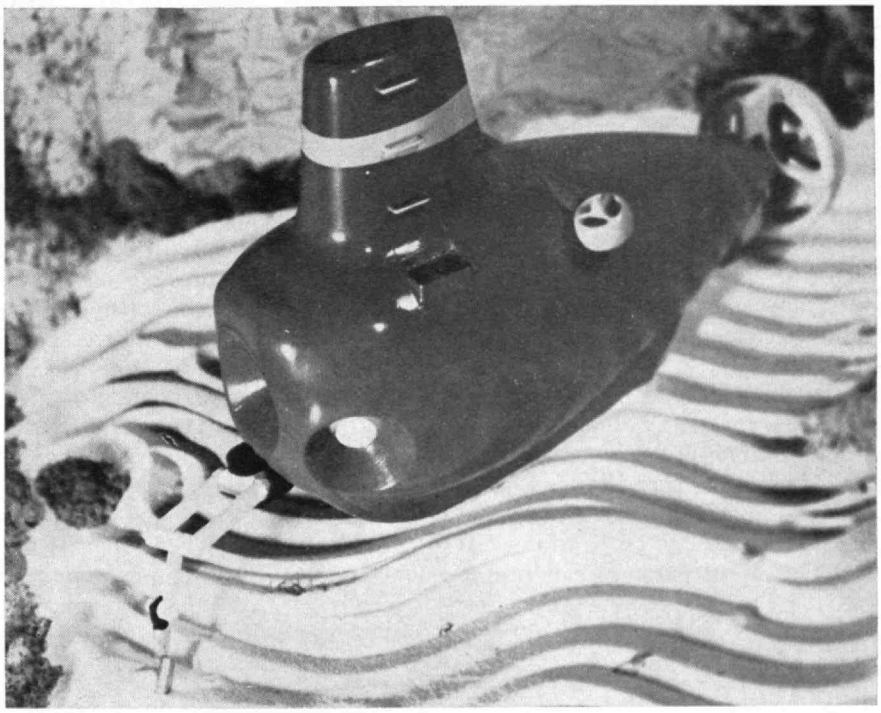
BY JAN HAHN

SEVERAL oceanographic research submarines have been planned in recent years. One of them now nearing completion is for the Woods Hole Oceanographic Institution and is called the *Alvin*. Supported by funds from the Office of Naval Research, the construction contract was awarded to the General Mills Electronic Division of Minneapolis on a bid of $575,000.

Like many other research tools, the *Alvin* will be a compromise. Its designers were told that it had to be small and comparatively light (about 20,000 pounds), so that it could be carried on the deck of the *R.V. Atlantis II*, yet accommodate two men. Without waiting for the development of new materials and techniques, a vessel had to be planned, within a limited budget, that would be quite safe to operate.

An operating depth of 6,000 feet was selected as a convenient value to satisfy present needs. This depth opens to exploration about one sixth of the bottom area of the ocean, including adjacent seas, seamounts, island slopes, etc., and provides access to the submarine canyons along the Continental Slope. High speed was not required; a four-knot sustained speed with a capability to make short spurts of six knots was found adequate. No intricate maneuvering was needed, but the *Alvin* had to dive at 200 feet per minute, have a stopping distance of 100 feet and be able to hover and control pitching and yawing motions.

The scientific equipment had to be flexible depending upon the type of work required, but a minimum pay load of 1,200 pounds was required in addition to the 500-pound allowance for personnel and their equipment. Exclusive of navigation and safety equipment the *Alvin* will carry a scanning sonar, underwater TV, telephone, echo-sounder, power converter, cameras, lights, recorders, etc. A mechanical arm will make it possible to select a particular boulder or other object from the ocean floor.



A model of the "Alvin" designed for two men and 1,200 lbs. of equipment.

The primary necessity for a deep submersible is a steel sphere, large enough to hold a pilot, an observer, and equipment, yet strong enough to withstand great pressures. The sphere is to have a hatch and four viewing ports of plexiglass and a peephole on top for surfacing purposes, which added to the difficulty of making it strong. The Woods Hole Oceanographic Institution is taking no chances. Three identical hulls are being manufactured, one of which is undergoing exhaustive tests. A collapse depth of 10,800 feet was specified, providing a safety margin higher than for military submarines.

The pressure hull, fabricated from HY-100 steel, has an inside diameter of 79.3 inches and a minimum nominal thickness of 1.33 inches. The sphere is spun as two hemispheres, heat treated, machined inside to the finished dimensions, welded together and machined outside. Cutouts for the port and hatch inserts were machined from forged stock, welded into place, and the assembled sphere stress relieved at 1,050 degrees F. for three and one half hours. Theoretically the *Alvin* pressure hull will fail due to yielding before it buckles elastically, at a pressure of 6,400 psi, which corresponds to an ocean depth of 14,400 feet, more than twice the desired operating depth.

JAN HAHN lives on Boston's Commercial Wharf and edits Oceanus, *a quarterly published by the Woods Hole Oceanographic Institution.*

Just to make sure, one of the three hulls will be placed under external pressure in a tank at the Southwest Research Institute until the hull collapses or to 6,000 psi (equivalent to 13,500 feet) the maximum pressure that can be applied in the tank.

The forward sphere and forebody of *Alvin* are to be positively buoyant and additional buoyancy for the power supply, pay load, etc., will be provided by the stern spheres and plastic buoyancy material (hatched area, in sketch below). The power supply and main propulsion equipment are open to the pressure of the sea and housed aft of the hull inside the Fiberglas fairing.

It was not found necessary to provide the *Alvin* with any surface mobility, since a mother ship will be available. Hydraulic power was selected to obtain the advantage of versatility and fineness not available from electric motors directly. Two DC motors of 11 HP running in oil drive two hydraulic pumps, one of which is constant volume and the other variable, providing an impressive range of speed and power. Solenoid-operated valves reverse the flow to the hydraulic motors so that the electric motors can run at constant speed in one direction. Two speeds are available at 60 and 120 VDC. The main propeller is driven by a 15-HP hydraulic motor and the port and starboard propellers each have a 7½-HP motor. If the *Alvin* needs a burst of speed the two electric motors, surrounded by cold deep-sea water, can be overloaded to 11 HP for short periods to provide a six-knot speed.

Since *Alvin* will spend a great deal of its time hovering or maneuvering slowly, rudders and diving planes would not be of much use. The main propeller takes the place of a rudder and can be moved by hydraulic rams. The port and starboard engines can rotate 360 degrees about an athwartship axis to provide fore-and-aft or up-and-down thrust.

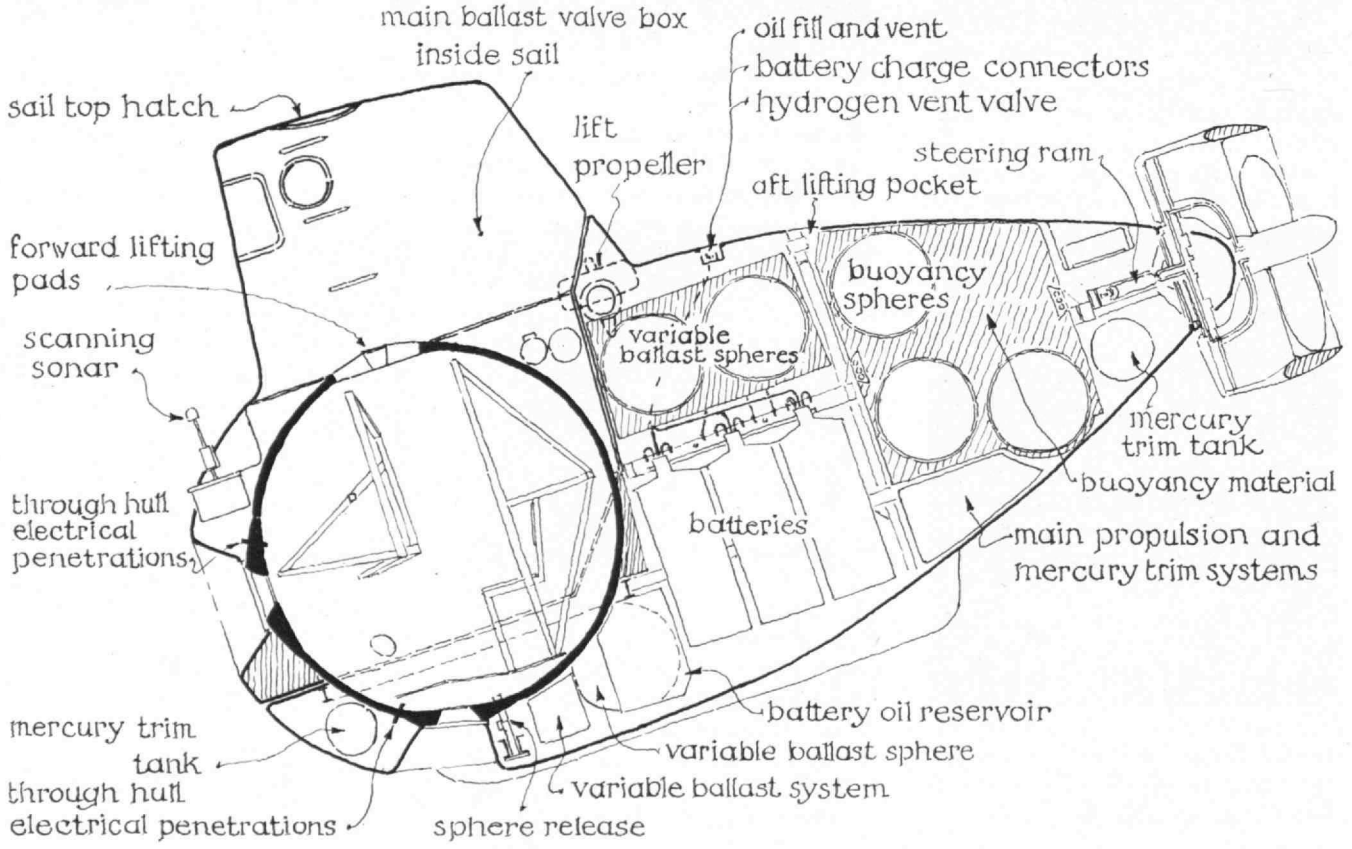
The main ballast tanks have floods and vents similar to those on conventional submarines and are blown by compressed air. The valves and vents are solenoid operated from within the sphere. Fore-and-aft trimming is supplied by moving about 600 pounds of mercury rapidly in a closed circuit by means of a hydraulic system pumping oil. This trimming system is expected to make a quick change in attitude possible when *Alvin* is following a rough bottom contour, and to provide an up-or-down angle of 30 degrees for ascent or descent.

The over-all trim of the craft is obtained by oil from trim tanks displacing sea water within the envelope. The *Alvin* can be made light, heavy, or neutrally buoyant at any desired depth and the trim system with a capacity of 600 pounds can compensate for various pay loads, weight of personnel, and changes due to water density variations.

Exotic power supplies such as fuel cells or nuclear power may come into use eventually, but for the present *Alvin* relies on old-fashioned lead-acid battery power stored in three oil-filled pressure compensated boxes, aft of the pressure hull. If more power is needed for some particular mission the stored energy can be quadrupled for the same weight but at about 10 times the cost by using silver-zinc batteries. A total of 225 cells will provide 39 kwh for propulsion and other use and 19.5 kwh for the scientific instruments.

The two men in the sphere will share about 170 feet of cubic space with the instruments and controls and be supplied with oxygen for an eight-hour dive, with provision for longer periods in an emergency. The air is to be circulated past the occupants to rear racks where the carbon dioxide is to be absorbed by lithium

(Concluded on page 50)



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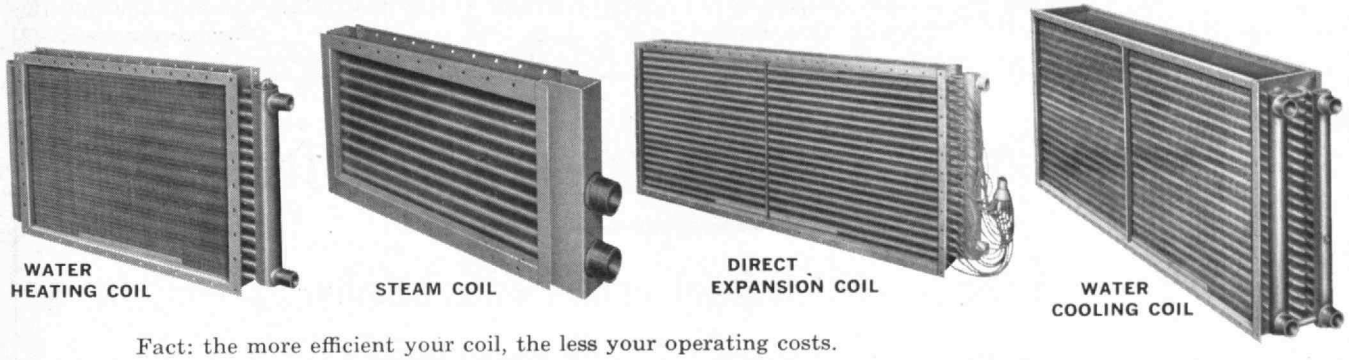

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New Books

FRAME-UP! The Story of Essex, Its Shipyards and Its People, by Dana Story, '41 *(Barre Publishers, $4.95).*

Reviewed by Evers Burtner, '15, *Associate Professor of Naval Architecture and Marine Engineering, Emeritus.*

"FRAME-UP!" a shipyard call for help in the erection of a just assembled transverse frame of a wooden ship, is the title of an interesting account of Essex, Mass., shipbuilding. Somewhat as the ribs of the human body sustain the skin outside and protect the organs inside, the ship's frames or ribs support the outer planking and protect the cargo, equipment, etc., inside. Setting up the frames on the vessel's keel is an important step in its building. Each frame comprises a number of pieces of oak doweled or bolted together, so heavy that the aid of all available shipyard workmen was required for their erection and lining up.

Dana Story describes the spectacular, typical launching process and also a most unusual system of heeling the hull so that it was launched on the keel and on part of the bilge. The narrow and very crooked Essex River made launching and towing away of the larger vessels difficult, at times accompanied by accidents or frustration. The reviewer recalls leaving Boston in company with three M.I.T. seniors on the Tug *Sadie Ross* which was bound for Essex. During the three- or four-hour run to Gloucester for a local pilot, thesis test data on this steam tug were taken. Although it was planned that a Gloucester based tug would accompany us to Essex and help tow the Schooner *Adams* to Gloucester for fitting out, this tug didn't appear.

Arriving at Essex the *Ross* put a very short tow line to the bow of the *Adams,* and towed her about a half mile when the schooner went hard aground. As her bowsprit blocked the channel, the tug *Sadie Ross* had to return to Essex and tie up alongside a wharf. There she grounded out a low tide while waiting for another high tide and further towing of the *Adams.*

The mobility of the automobile, higher general wages, and the depletion of good quality shipbuilding timber in southern New England combined to end the three-century-old shipbuilding period in Essex. Fishing vessels similar to those from Essex are still built in Maine and Nova Scotia. Many 70-foot shrimp boats with steam-bent frames also are constructed in Florida.

Essex, perhaps more than other eastern Massachusetts communities, retained its distinctive colonial atmosphere for a long period. The pride of Essex men in their abilities, special skills, physical fitness, and loyalty to the locality and genial, considerate management, despite the industry's ups and downs, gave the men a close fellowship and local distinction. When shipbuilding employment was at a low ebb, some income or at least sustenance could be derived from the extensive protected clam flats or small farms. Thus many Essex people tended to stay put. Thorough workmanship de-

(Continued on page 42)

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New Books

(Continued from page 40)

manded to ensure a seaworthy vessel undoubtedly was reflected in the honesty and good moral character in general of Essex people.

Many anecdotes of important and unique personalities are included in the book, some of which are amusing. Several of the practical jokes described could warrant the title "Frame-Up" in a far different sense than the wooden shipyard term.

Although the author, Dana Story, is a fifth generation of the Story shipbuilding family, in this book he credits the achievements of rival Essex builders. The listing, in the appendices, of the builder, year, ship type and tonnage, with some records as early as 1850, helps give the book a documentary standing. It is remarkable that this village built some 4,000 vessels in three centuries of shipbuilding.

One chapter deals with the author's father, his forthright manners, home, and community life, the successful shipbuilder who was responsible for the construction of a record 425 vessels. Dana Story's almost continuous residence in Essex, educational background, his effective life as a shipyard employee and later as manager of his own yard, his great interest in Essex, in its people, together with his heritage both by blood and of records all serve to give this account a high degree of accuracy.

The 16 full-page sepia pictures of the shipyards, of vessels under construction, together with the text, give the reader a summary of wooden ship construction without many tiring technical details.

Have You Seen These?

OTHER recent books likely to be of especial interest to many M.I.T. Alumni have included:

Formaldehyde, 3d edition, by J. Frederic Walker, '25 (Reinhold Publishing Corporation, $23).

Inertial Navigation Analysis and Design, by Cedric F. O'Donnell, '51 (McGraw-Hill Book Co., Inc., $18.50).

Information Theory: An Introduction for Scientists and Engineers, by Gordon Raisbeck, '49 (The M.I.T. Press, $4).

Materials and Fuels for High-Temperature Nuclear Energy Application, edited by Massoud T. Simnad, former Visiting Professor in the Departments of Nuclear Engineering and Metallurgy at M.I.T., and Lloyd R. Zumwalt (The M.I.T. Press, $12).

New Curricula, edited by Robert W. Heath, with chapters by James R. Killian, Jr., '26, and Professor Jerrold R. Zacharias and Stephen White (Harper & Row, $2.95).

Rutherford and the Nature of the Atom, by Edward N. da Costa Andrade (Anchor Science Study Series, Doubleday & Company, Inc., $1.25).

STRESS: A User's Manual, by Assistant Professors Robert D. Logcher, '58, and Samuel P. Mauch, '63, of the M.I.T. Department of Civil Engineering, Kenneth F. Reinschmidt, '60, and Steven J. Fenves (The M.I.T. Press, $2).

Why Teach Physics? edited by Sanborn C. Brown, '44, Professor of Physics and Associate Dean of the Graduate School at M.I.T., Norman Clarke, and Jayme Tiomno (The M.I.T. Press, $3.50).

(Continued on page 44)

Ever try to explain something technical to an advertising man?

If you have ever known this peculiar frustration, read about an advertising agency as thoroughly at home with technical matters as we are qualified to give you advertising advice.

Most agencies subscribe to the theory that advertising and science are immiscible.

The rationale seems to go something like this: the imagination you need to dream up advertising ideas gets bogged down by even a passing knowledge of chemistry and physics.

Of course the agency executives who solicit your account will assure you that they have some boys back at the shop who "understand all this technical stuff." The inference becomes clear when you begin to work with them. You can have your choice of advertising men who know nothing about science or technically trained people who know nothing about advertising.

That's why we started an agency.

We say you lose either way. The theory of immiscibility is just a superstition to us, and we are prepared to prove it. Before starting our own agency, one of us was advertising manager of a company marketing electronic systems. The other, a graduate engineer with an advanced mathematics degree, was writing and supervising copy at one of the big consumer agencies.

From these vantage points, we evaluated the selling job being performed by agencies in the technical marketplace. This evaluation encouraged us to set up an advertising agency based on some novel ideas about what a company like yours has a right to expect from a company like ours.

Some reasonable expectations.

You should expect the people who make the decisions—the agency principals—to know the difference between an oscilloscope and a TV set. They should be readers of this magazine, not just because they have clients who advertise here, but because they are as swept up in the pace and excitement of science and engineering today as you are. You should be able to assume that they are aware of the latest views on the workings of the human cell, the properties of a magnetic film or the structure of a polymer. Dealing with such people, you will naturally save a lot of briefing time. But you will also find it easier to achieve the appropriate level of knowledgeability in your advertising copy.

You should expect your agency to welcome, not duck, collateral work. They should know how to turn out newsletters, brochures and presentations that help you get more results from your advertising. They should even plan and create promotion packages that include no advertising at all—when that's the best way to get the job done.

You should expect your agency to think of you as a "glamour account." No other facet of society can hold a candle to the scientific world when it comes to excitement. Yet most agencies secretly consider companies that have made a mark in this world, as dull accounts. Ironically, mundane products like cigarettes and soap still grab all the glory. And believe it or not, your "image" back at the agency has a lot to do with the quality of the work they do for you —and the caliber of the people working on your account.

Why a coupon?

You may be surprised to see a coupon in an ad of this type. But we can't think of a better way to find out where the people are who are looking for our special approach to advertising and promotional problems.

So far as we know, no agency in history has ever landed an advertising account through a coupon. But send it along anyway, so we can tell you more about ourselves and show you some work we have done for our present clients. We might even make history together.

Mark Nadler

Robert Larimer

Nadler & Larimer, Inc.
39 West 55th Street
New York, New York 10019 212 LT 1-6950

Please get in touch with me to arrange a meeting.

*Name*_____

*Company*_____

*Address*_____

*City*_____ *State*_____

New Books

(Continued from page 42)

YANKEE SCIENTIST, by John Anderson Miller *(Published by the Mohawk Development Service).*

Reviewed by Karl L. Wildes, '22, *Professor of Electrical Engineering, Emeritus, at M.I.T.*

OUR "Yankee Scientist" is William David Coolidge, '96, and for 39 years inventor, research scientist and engineer in the Research Laboratory of the General Electric Company. His researches in materials for incandescent lamp filaments leading to the production of ductile tungsten, his invention and development of the Coolidge x-ray tube, and his many other scientific achievements make a fascinating story in themselves, but the author has gone beyond these accomplishments and has told us about the person, William Coolidge, from his birth to the celebration of his 90th birthday October 23, 1963. The treatment is not philosophic or analytic; it makes no attempt to explain what makes him the kind of person he is, but in a very down-to-earth way relates his doings and sayings and describes the environments in which he lived and worked.

He is about as "Yankee" as one can be, his first American ancestors, John and Mary Coolidge, having come over from England with Governor Winthrop in 1630. Settled upon 30 acres of land in Watertown, John Coolidge became "Deputy to the Great and General Court of the Massachusetts Bay Colony" and his several sons established branches of New England Coolidges including the Vermont one which produced President Calvin Coolidge. William's parents were farmers in the town of Hudson, about 28 miles from Boston, and his childhood was a happy one with few luxuries but much kindness and encouragement. A vivid word picture of the town portrays its small mills, churches, apothecary shop, and especially the primitive one-room six-grade school where Will, as he was then called, began his formal education. His inventive nature showed itself during his grade school and high school days through his experiences in fishing, photography, and around the home. As valedictorian in his high school class he presented a discourse entitled "Life is Opportunity." This optimism characterized his attitude toward life and toward his associates all through his career. His interest in things electrical and mechanical led him to apply for a state scholarship to cover tuition at M.I.T. and in 1891 he entered "Boston Tech."

The account of M.I.T., its philosophy of education, the early buildings in Boston's Back Bay, living conditions, social and athletic activities, and subjects of instruction will be of special interest to readers with M.I.T. affiliations. One of the factors most influential in shaping Coolidge's future was the discovery of x-rays by Roentgen in 1895 and the keen interest of the Faculty and senior students in these rays. During the summer following his graduation he built a small x-ray machine which he sold to a home-town physician. Another fortunate M.I.T. experience was his study of chemistry under Willis R. Whitney, '90, who later founded the General Electric Research Laboratory.

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New Books

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His liking for the academic atmosphere brought him back to M.I.T. in 1896 as an assistant in physics and by June, 1897, he had been awarded a fellowship and was on his way to Leipzig for a doctoral study under the famous Professor Paul Drude. Contrasts between the American and European scenes are presented in some detail. Personal anecdotes and humorous incidents are blended with descriptions of his personal friends, his visit to Italy, the presentation of his first paper in Düsseldorf, its publication in the *Annalen der Physik und Chemie*, and a side trip to Jena where he saw the kind of glass blowing which would later contribute to his work in vacuum tubes. Finally, in July, 1899, having passed his examinations with the highest marks, he was presented the doctor of philosophy degree *summa cum laude*.

Back at M.I.T. in September, he taught physics for a term and then became assistant in chemistry, working under Professor Arthur A. Noyes, '86, on electrical conductivity of aqueous solutions at high temperatures. Dr. Whitney still maintained his connection with M.I.T. and kept in contact with the work Coolidge was doing. This contact eventuated in a proposal that Coolidge join Whitney in the General Electric venture. Although hesitant to leave the freedom of scientific inquiry enjoyed at M.I.T., Dr. Coolidge accepted the invitation in 1905 and, as he remarked later, "I found to my pleased surprise that Dr. Whitney had transferred a lot of academic atmosphere from M.I.T. to the new laboratory."

His first important task was the improvement of incandescent lamp filaments. The General Electric Company had just introduced metalized carbon filaments but the Germans were already using osmium, tantalum, and tungsten. American rights to the German process of manufacturing tungsten filaments were secured, but Coolidge perfected a superior process, and by the end of 1907 almost half a million "Mazda" squirted-filament tungsten lamps had been sold. Brittleness was the chief weakness of the new filament, and at this point the author provides a detailed story of how Dr. Coolidge solved this problem through the development of ductile tungsten, resulting, in 1910, in the "Mazda C" lamps with drawn tungsten filaments. By 1914 Dr. Coolidge was assistant director of the laboratory, and was awarded the Rumford Medal, which was granted for "the most important discovery or useful improvement in heat or light."

This work on tungsten and the General Electric research on high vacua attracted Irving Langmuir, a professor at Stevens Institute of Technology, to join forces with Whitney and Coolidge in Schenectady. In 1912 Langmuir's experiments revealed to Coolidge the possibility of a stable and reproducible emission of electrons from hot tungsten in a vacuum. This was the key to the improvement of x-ray generators, which were limited in power by the gas content of the tube. The earlier developments in tungsten technology were now combined with the high-vacuum techniques to produce a new high-vacuum, high-voltage x-ray tube having a hot tungsten cathode and a tungsten target. A radiologist,

(Concluded on page 48)

Four of these didn't save the rabbit!

Charms! Wonderful, maybe, for people not concerned with fire insurance. Everyone else knows protection depends upon planning, not rabbit's feet; coverages, not horseshoes. No amount of luck can prevent fires. No amount of wishing can pay fire's heavy bills.

This is where Manufacturers Mutual comes in. One hundred and twenty-nine years ago it was organized as a unique insurance company whose first objective was stopping fires before they started. Ever since, this philosophy has dominated. Today Manufacturers Mutual is still the leader in providing policyholders with practical, up-to-date fire-prevention and fire-fighting techniques.

Down through the years, Manufacturers Mutual and its Associates have also led the way in broadening fire insurance and related coverages. All in all, **they've** introduced 19 industry "firsts" — a record unequalled by any other company or group. Another reason why, for insurance protection, you should turn to Manufacturers Mutual for the finest. Phone, wire, or write the nearest office today. Before your luck runs out!

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Over $90,000,000,000 Insurance in Force in the Factory Mutual Companies

Hovey T. Freeman, *Chairman*	'16
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Maurice W. Williams	'22
Norman E. Harris	'33
Kenneth M. Warren	'35
Charles W. Freeman	'40
Colin A. Roberts	'46

The oldest company with the lowest net cost of the seven Factory Mutual Companies

New Books

(Concluded from page 46)

Dr. Lewis Gregory Cole, was the first to equip his office with the new apparatus and at a dinner in New York City in 1913 he named the new device the "Coolidge Tube." The x-ray story runs through the remainder of the book and includes: cathode rays outside the generating tube, field x-ray equipment used during World War I, dental applications, flaw detection in metal castings, multisection tubes, and 20-million-volt x-rays in the betatron. In his acceptance of the Roentgen Medal in the summer of 1963, he said, "I am particularly happy to receive this award because Roentgen's discovery has been the underlying basis of so much of my work, and also because I had the privilege of meeting him when I was a student at Leipzig."

As Dr. Whitney's activities declined, Dr. Coolidge took over a larger share of the administration of the laboratory, becoming associate director in 1928 and director in 1932. His friendly and optimistic spirit certainly contributed heavily to the co-operative interplay and success of its large staff. At a dinner in his honor when he retired in 1944 as Vice-president and Director of Research, he announced his successor, C. Guy Suits, and said, "There is one thought which dominates and dwarfs all others, and that is the thought of how lucky I have been in my associates. It was my luck; but Dr. Whitney's careful hand-picking was responsible."

In retirement during the last 20 years, Dr. Coolidge has continued as consultant, not only for the General Electric Company, but for many other enterprises around the world. He and Mrs. Coolidge have enjoyed good health and have made extensive tours to interesting places. The appended lists of honorary degrees, medals and awards, patents issued, and papers published summarize in some degree Dr. Coolidge's accomplishments and the public recognition of his service to society on a world-wide scale.

The book closes with Dr. Coolidge's affirmation that the world is not going to the dogs, but he says, "Trained minds, firm character and dauntless courage will be needed to wrestle with the problems of the future, to master their threatening dangers, and to force from them the beginnings of a better, more peaceful, and richer world. There has never been a danger to an individual or nation in knowing too much. The danger always comes from knowing too little."

Honored Books

Strategy and Structure: Chapters in the History of the Industrial Enterprise, by Alfred D. Chandler, Jr., formerly Professor of History at M.I.T., won for him the Thomas Newcomen $1,000 Award in Business History made by representatives of *Business History Review* and the Newcomen Society.

Beyond the Melting Pot: The Negroes, Puerto Ricans, Jews, Italians and Irish of New York City, by Nathan Glazer and Daniel Patrick Moynihan, won for them a $1,000 Anisfield-Wolf Award in Race Relations given under the sponsorship of *The Saturday Review.* Publication of the book was sponsored by the Joint Center for Urban Studies of Harvard University and M.I.T., and a paperback edition will be released this summer by The M.I.T. Press at $1.65.

2-Man Submarine for Research

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hydroxide, commonly used in military submarines. Water vapor will be absorbed by sponges which have been soaked in lithium hydroxide and dried in a vacuum oven.

A great deal of effort has gone into making the diving as safe as possible. SCUBA gear will be on board for shallow water escape, the batteries are outside so that the occupants cannot be exposed to hydrogen and chlorine fumes, and all systems are designed so that failure of a component will not result in disaster. If the sub were caught on the ocean bottom its maneuverability with the three variable propellers and rapid shifts of the mercury trimming would probably set it free. The mechanical arm by its very nature may be caught but can be detached and dropped off from inside the pressure sphere. All other surface protuberances are kept to a minimum. Still more buoyancy can be obtained by dropping the batteries, each section providing a lift of about 1,000 pounds. The 600 pounds of mercury also can be jettisoned and, if all else failed, the pressure sphere and forebody could be detached from the rest of the structure to float to the surface.

Although the *R.V. Atlantis II* and the *Chain* are large enough to act as mother ships they have not yet been fitted out with the necessary lifting gear. One ingenious proposal involves a large catamaran "drydock" consisting of two huge rubber tanks, to be filled with water to accept the sub and then pumped out. This system presumably could be used also to tow the sub to a location.

What can be accomplished with the *Alvin* and the type of research for which it will be suited best had better wait until the sub is finished, tested, and evaluated. Testing probably will begin this year in a good-weather, warm-water area such as the Bahamas or Bermuda. *Alvin* is another oceanographic tool or method, and from long experience oceanographers have learned not to announce "we are going to do thus or so," when a hostile environment and instrumental failure or human fatigue can prevent the accomplishments of the tasks set.

As you shoot for par...our unique "Financial Cabinet" follows through with a professional investment program for you

The days you devote to your vocation, the hours you spare for your avocation, fill your calendar. In your busy executive schedule, how can personal financial planning get the attention it deserves?

The answer is available at Boston's "Financial Cabinet." Here are specialists who will give you skilled assistance in the specialty which distinguishes Boston Trust from virtually all other banks—management of personal capital. Their services are completely personalized. Your investment program would be designed specifically to meet your financial situation, your needs, your objectives.

This is a full-time job. This is our job. May we perform it for you? You can answer by telephoning Area Code 617 LI 2-9450, or writing Dept. KK-17. Ask for our new booklet, "Dynamic Investment Management."

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SAFE DEPOSIT AND
TRUST CO.

100 Franklin Street, Boston, Mass. 02106

Individuals Noteworthy

(Continued from page 10)

New Posts

NAMED in the news of promotions, elections, and appointments recently were:

William Webster, '23, as a Director, Aetna Life Affiliated Companies . . . *Jesse L. Maury, '25,* as President, the Perlite Institute . . . *Ralph B. Norton, '25,* as Vice-president and Technical Director, the Kerite Company;

Albert J. Gracia, '28, and *Russell DeYoung, '40,* respectively, as Vice-president—Research; and as Chairman and Chief Executive Officer, The Goodyear Tire & Rubber Company . . . *Carl J. H. Wahlstrom, '32,* as Senior Staff Engineer, Design Engineering Department, Technical Division, Humble Oil & Refining Co., Baytown, Texas;

Captain Marvin H. Gluntz, '35, as Secretary, Society of Naval Architects and Marine Engineers . . . *John F. Keefe, '35,* as Manager of Research and Advertising, New Haven Railroad . . . *Richard U. Bryant, '36,* as Plant Engineer, The Granet Corporation;

Franklin S. Atwater, '38, as a Director, Fafnir Bearing Company . . . *Robert H. Cotton, '39,* as President-elect, American Association of Cereal Chemists . . . *Howard H. Reynolds, '39,* as Professor and Chairman of the Chemical Engineering and Paper Engineering Departments, Lowell Technological Institute;

Julius P. Molnar, '40, as a Trustee, American Optical Company . . . *Eldred Timson, '40,* as Vice-president—Manufacturing, Sunbeam Corporation . . . *C. Herbert Wheeler, Jr., '40,* as Associate Professor of Architectural Engineering, the Pennsylvania State University;

William R. Johnson, '42, as Manager, New Products Development, Associated Spring Corporation . . . *Earl L. Bimson, '43,* as Executive Vice-president, Valley National Bank of (Phoenix) Arizona, and as a Director, Financial Executives Institute . . . *J. Vincent Fitzgerald, '43,* and *Robert L. Coble, '55,* as Fellows, The American Ceramic Society;

Ward J. Haas, '43, as Director, Space Science Research Center,

University of Missouri . . . *Abraham J. Goldberg, '44,* as Director of Architecture and Construction, Universal Food Systems, Inc. . . . *Captain William C. Hushing, '44,* as Commanding Officer, Portsmouth Naval Shipyard, Kittery, Maine;

Elroy E. Frye, '47, as Manager of Sales, Gulf Coast, The M. W. Kellogg Company . . . *Roger S. Holcomb, '47,* Refinery Manager, American Oil Company, Salt Lake City . . . *Daniel S. Maisel, '47,* as Head, Projects and Long-Range Planning Department, Enjay Chemical Company;

E. William Cummings, '48, as Chief Plant and Process Engineer, Saginaw Steering Gear Division, General Motors Corporation . . . *Ezra Garforth, Jr., '48,* and *John R. O'Donnell, '53,* respectively, as President and as Sales Manager—Steel Mill Division, Philadelphia Steel and Wire Corporation;

Robert L. Rannow, '48, as General Sales Manager—Administration and Sales, H. Sand & Company, Inc. . . . *Charles W. Shipman, '48,* as Professor of Chemical Engineering, Worcester Polytechnic Institute . . . *Hans U. Wydler, '48,* as Vice-president and Officer in Charge, International Department, Manufacturers National Bank of Detroit;

Harold E. Proctor, Jr., '49, as Manager of Engineering, Gabriel Electronics . . . *Robert G. Davidson, '50,* as Executive Director, Metropolitan Area Planning Council (Boston) . . . *A. John Esserian, '50,* as Manager, Personnel and Industrial Relations, Physics Research Division, Geophysics Corporation of America;

Robert J. Bartels, '51, as Associate Professor of Planning, School of Architecture, Syracuse Univer-

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Individuals Noteworthy

(Concluded from page 53)

sity . . . *A. F. de Vitry d'Avaucourt, '51,* as a Director, Ionics Incorporated . . . *Carlos N. Graf, '51,* as President, Overseas Chemical Division, W. R. Grace & Co.;

C. Stanford Olsen, '51, as District Manager, Central Sanitary Sales, Dorr-Oliver Incorporated, Chicago . . . *Robert L. Richards, Jr., '51,* as Assistant Plant Manager, Clinton (Iowa) Plant, E. I. du Pont de Nemours & Company . . . *Daniel Shew, '52,* as Manager, Product Development, Research Center, Stauffer Chemical Co., Richmond, Calif.;

Richard P. Simmons, '53, as Superintendent, South Plant, Republic Steel Corporation, Cleveland . . . *Harry M. Salesky, '57,* as Executive Vice-president—Administration, Champ Hats . . . *Paul M. DeRusso, '58,* as Professor of Electrical Engineering, Rensselaer Polytechnic Institute;

Martin L. Levin, '58, as Assistant Professor of Sociology and Anthropology, Emory University . . . *John P. Eberhard, '59,* as Deputy Director, Institute for Applied Technology, National Bureau of Standards . . . *Burton E. Eno, '59,* as Associate Professor of Mechanical Engineering, South Dakota State;

Harry S. Scherzer, '59, as Assistant Product Manager, Films Division, Kordite Corporation . . . *Elmer N. Lenk, '61,* as Director of Advertising and Public Information, Western Electric Company . . . *Alfred B. Lang, '62,* as Manager—Manufacturing Engineering, Fenwal, Inc.

New Sloan Fellows

FORTY-FIVE Alfred P. Sloan Fellows will begin a year of study in the Sloan School of Management this month. They are:

Michael H. Akeroyd, A. W. Brook, Ltd., Leicester, England; *Albert L. Baker, Jr.,* RCA Service Company, Camden, N.J.; *Richard H. Boehm,* Kimberly-Clark Corporation, Neenah, Wis.; *James C. Buck, '49,* American Smelting & Refining, New York; *James V. Chabot, '46,* Ford Motor Company, Dearborn, Mich.; *Robert C. Collins,* United Air Lines, San Francisco; *Richard E. Disbrow,* American Electric Power Service Corporation, New York; *Wilbur D. Dowden,* Sun Oil Company, Dallas; *John D. Ericson,* Kennecott Copper Corporation, Salt Lake City; *Henry B. Ferguson, '50,* U.S. Steel Corporation, Pittsburgh; *Paul Flam,* Scott Air Force Base, Ill.; *Heinz K. Fridrich,* Internationale Buero-Maschinen, Germany; *William A. Frye,* General Motors Corporation, Detroit; *George E. Ganter,* Union Carbide Corporation, New York: *Pierre P. Gaudissart,* American Cyanamid, Wayne, N. J.; *Donald J. Gavis,* IBM Corporation, New York; *Alberto Ghitis,* Universidad Del Valle, Cali, Colombia; *Henry F. Goelzer, '46,* The Marquardt Corporation, Van Nuys, Calif.; *John H. Goldie,* The Boeing Company, Seattle; *Nolan R. Gregston,* Creole Petroleum Corporation, Caracas, Venezuela; *Radoy W. Heggland,* Continental Oil Company, Lafayette, La.; *Jack W. Hendrix,* Brown Engineering Company, Inc., Huntsville, Ala.; *Glenn L. Hermansen,* Western Electric Company, Inc., N.Y.

Also: *Neil A. Holmberg,* National Aeronautics and Space Administration, Santa Monica; *James A. Kempe,* Illinois Bell Telephone Company, Chicago; *Edward G. Koepnick,* Wright Patterson Air Force Base, Ohio; *Charles M. Laidley,* Canadian Imperial Bank of Commerce, New York; *Witt I. Langstaff,* Eastman Chemicals Products, Inc., Kingsport, Tenn.; *Edward J. Lievens, Jr.,* National Aeronautics and Space Administration, Washington; *William G. McGagh,* Chrysler Corporation, Detroit; *Frederick V. Martin, Jr.,* Fairchild Stratos, Hagerstown, Md.; *Joseph A. Mix,* The Kendall Company, Charlotte, N.C.; *Robert A. Nafis,* Grumman Aircraft Engineering Corporation, Bethpage, L.I.; *John J. Puma,* Boston Edison Company, Boston; *Norman W. Rasmussen,* H. P. Hood & Sons, Boston; *Harold L. Salisbury,* Campbell Soup Company, Camden, N.J.; *Gerard W. Schoenwald,* Oceanside, L.I.; *Harry Schrage,* Arlington, Mass.; *Walter C. Scott,* National Aeronautics and Space Administration. Washington; *Henry W. Stigler,* IBM Corporation, New York; *Don N. Stitt,* Rockwell Manufacturing Company, Chicago; *Emmerich L. Takacs,* Austrian Airlines, Vienna; *Robert D. Traugott,* The Singer Company, State College, Pa.; *Sam R. Willcoxon,* American Telephone & Telegraph Company, Omaha, Neb.; and *George M. Zriny,* Bell Telephone Laboratories, Inc., N.Y.

Campus Veterans

SERVICE PINS and M.I.T. chairs were given to three Institute employees this spring in recognition of 25 years of service. They were Schuyler Holbrook, project machinist in Chemical Engineering; Newell Miner, Instrumentation Laboratory guard; and Victor Saganey, second cook in the Graduate House.

You get 'Blue Chip' service with 'Blue Chip' insurance

...and it's low in net cost, too

Maybe you've noticed him—a man in your community sporting a blue chip. That blue chip in his lapel is more than mere decoration. It distinguishes the agent of Connecticut Mutual... a life insurance *career* man, trained to give you wise guidance and the most for your money in family protection, personal retirement programs, business insurance, pension and profit-sharing plans.

Another Blue Chip plus: he represents a 118-year-old company whose record of higher dividends has meant *lower net cost* for its policyholders.

Discuss your life insurance with the man with the CML Blue Chip. He'll give you nothing less than Blue Chip service!

THE Connecticut Mutual Life

INSURANCE COMPANY • HARTFORD AND 300 CITIES FROM COAST TO COAST

Your fellow alumni now with CML

Richard E. Boraks	'59	Hartford
Richard C. Fay	'50	Home Office

Trend of Affairs

(Continued from page 29)

The M.I.T. Symposium in New Jersey

THE COUNSEL of high school teachers is important to college admissions officers, M. Bryce Leggett, '40, Associate Director of Admissions, told secondary school representatives at a symposium April 18 in Newark. To make a meaningful evaluation of an applicant, he said, it is necessary to have the help of teachers in assessing the quality of the student's work, his intellectual environment, and the scope of his curriculum. Information on these factors, added to the data from College Entrance Boards and the subjective evaluation made in personal interviews, yields a better understanding of a prospective student.

Mr. Leggett spoke on "Admissions—A Co-operative Process," at the morning session of the two-part symposium, "Engineering, Science, and Education for Tomorrow," at the Robert Treat Hotel. Approximately 120 Alumni, wives, guests, and secondary school representatives attended the meetings, sponsored by the M.I.T. Club of Northern New Jersey and the M.I.T. Educational Council.

In the morning program, "A Report to Secondary Schools," high school guidance counselors also heard talks by William Speer, Associate Dean for Student Counseling, on "The M.I.T. Student and His Environment," and by Jack H. Frailey, '44, Director of Student Aid, on "Scholarships, Loans and Jobs."

Emphasis in the afternoon symposium was on the impact, on undergraduate education, of advances in engineering and science. In "The New Engineering," Charles L. Miller, '51, Head of the Department of Civil Engineering, pointed out that new developments in materials, structural forms and processes, together with the application of high-speed computing techniques, have brought about a new epoch in civil engineering representative in many respects of changes in other fields.

The new discipline of plasma physics includes many frontiers of research, Professor Sanborn C. Brown, '44, said in "The Edge of Science." The theory of stellar energy mechanisms, the quest for fusion power, magnetohydrodynamics, even the physics of neon signs—all these fields and many more fall within the scope of plasma physics, he said, to the extent that this area of research at M.I.T. includes many projects in both science and engineering departments.

A consequence of the great accumulation of knowledge in science and engineering is the need to revise undergraduate courses, Professor Hartley Rogers, Jr., told the symposium. Dr. Rogers is associate professor of mathematics and a member of the M.I.T. Committee on Curriculum Content and Planning. The very bulk of science prohibits teaching it in detail, he said, and requires new methods. He suggested that the curriculum of the future may be based on a series of problems, with emphasis on the attitudes and analytical methods of science, to give a student basic information.

Howard W. Johnson, Dean of the Alfred P. Sloan School of Management, was the evening dinner speaker. He emphasized the need to train industrial managers to cope with and to foster new technology.

Joseph Wenick, '21, was general chairman of the symposium. Stuart G. Stearns, '39, was vice-chairman and Carlo N. De Gennaro, '53, was secretary. John T. Reid, '48, President of the M.I.T. Club of Northern New Jersey, presided at the morning session, and Russell P. Westerhoff, '27, guided the afternoon meeting.

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Dr. Stratton Addresses Council

PRESIDENT Robert H. Winters, '33, of the Alumni Association, presided at the March 30 meeting of the Council which brought friends together from many parts of the M.I.T. "empire" to hear President Julius A. Stratton, '23, and Professor Roland B. Greeley describe current students. Professor Greeley, who is director of admissions, emphasized the remarkable rate at which the number of qualified students in the United States is increasing, and both speakers used slides to present an analysis of the undergraduate and graduate bodies now at the Institute.

Miles S. Sherrill, '99, presented resolutions in memory of William A. Kinsman, '99, and David W. Skinner, '23, presented similar resolutions in memory of Dr. Egon E. Kattwinkel, '23.

Vice-president F. Leroy Foster, '25, presided at the April 27 meeting and the speakers then were Professor David H. Frisch, '47, on current technology, and William A. Baker, '34, on ancient technology.

Professor Frisch used a picture of the Tower of Babel to illustrate the state of knowledge regarding elementary particles, and pictures of work at the Cambridge Electron Accelerator to illustrate the efforts of M.I.T. and other physicists to reduce the uncertainties.

Mr. Baker, who is curator of the Francis Russell Hart Nautical Museum, explained its value to students and discussed the difficulties of building replicas nowadays of even the most famous ships of the past.

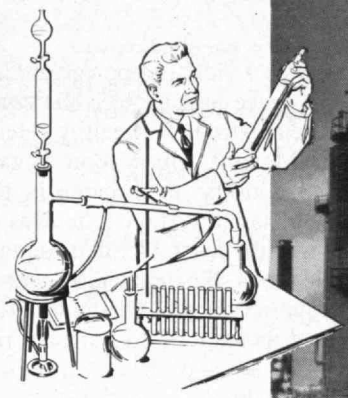
For Submarine Power

A HYDROGEN generator for non-nuclear submarines, to enable them to remain submerged for months, was described at the American Chemical Society's meeting this spring by William H. Heffner, '56, George T. Skaperdas, '38, and A. C. Veverka of the M. W. Kellogg Company. The hydrogen would be consumed in fuel cells to provide power for the submarine, and these cells would offer advantages over both conventional and nuclear submarines, Mr. Heffner said.

Wood alcohol and steam would be converted chemically into hydrogen, carbon monoxide, and carbon dioxide by a catalyst in the proposed generator. The gases then would go into a coil made of palladium and silver, which would allow only the hydrogen to pass through its walls to be fed to the fuel cell. Heat to operate the generator would be provided by burning the carbon monoxide and other waste gases with oxygen, which would also be necessary for operation of the fuel cell.

What Students Eat

M.I.T. men insist on knowing just what they are eating, *The Christian Science Monitor* reported last March 5. They like hamburgers and French fried anything—eggplant, onion rings, even cauliflower—but pass up soufflés, chiffon pies, and all yellow vegetables except corn. "I don't know what we'd do without mashed potatoes, peas, corn, and green beans," Pauline Harcovitz, executive dietitian, told the reporter. "They really like these, and they love scalloped apples—and all kinds of fritters."



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Why Civil Defense

(Concluded from page 23)

But let us, for the sake of the argument, assume that the American leadership might be a little more reckless if it felt that the people were well protected. There would then be a balancing force from the people themselves if they had an effective, extensive civil defense system. In the Cuban crisis of 1962, many voices, and some very influential ones, were heard advocating a firmer policy, and disdain for the dangers of war, because of a feeling that it would come eventually anyway. A civil defense program should produce, as a side effect, a population which is better informed about nuclear war, and less liable to want to "get it over with" at the cost of human lives. This would outweigh any increased aggressiveness that civil defense preparedness might engender.

It is difficult to write about the objectives and motivation of civil defense without thinking more generally about the problems of defense and future efforts to maintain peace. The question which is hard to avoid is whether the future will bring increasingly strong weapons and the devotion of an increasing fraction of our attention to questions of war and peace. The writer of these lines, at least, hopes that this will not be the case.

If leaders of all nations realize that the United States is determined to guard its independence and the way of life of its citizens, it is to be hoped that their objectives will change and that they will forsake aggressive tendencies. The Soviet Union, however, quite possibly may find itself under heavy pressure in the future to adopt a more belligerent attitude—and being able to point out that belligerency would not be very effective might then help its leaders resist such pressure.

A Fable

Once upon a time there was a rich and powerful Caliph who ruled his domain in peace and justice. His country was happy, and he himself extremely wealthy. Hearing of this felicitous land, Mongol tribes soon began to knock at the gates of his country, to threaten it, to invade it. Now the Caliph had one fault: he was very loath to part with his wealth, least of all to squander it on armies and fortifications. The inevitable came to pass. The Mongols conquered the Caliph's country, and he himself was finally captured in his strong room, amidst all his wealth. The Mongol Khan, who was a brutal man, ordered the Caliph's execution by a special method: pouring molten gold down his throat. "You see," said the Khan, "that gold which you have hoarded so assiduously will finally kill you."

The United States is not an eastern Caliphate. But the United States is an extremely wealthy country. It can well afford to protect itself. Does it seem prudent to save the taxpayer's money at the risk of losing the taxpayer?

NEXT MONTH: *The Review's features will include "Conversation With a Senior," a candid interview with a physics student at M.I.T., regarding his own education and his plans for the future.*

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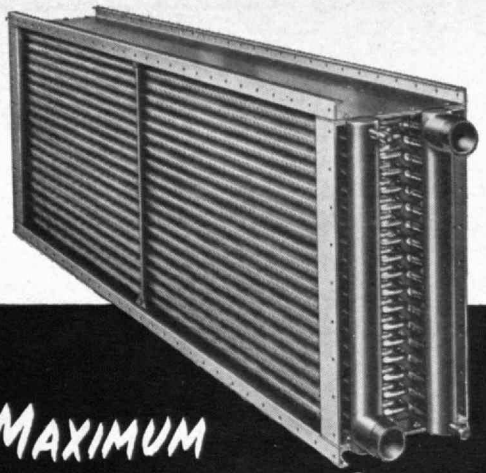

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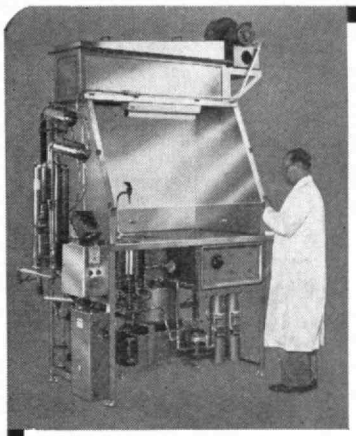

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The Innovation Industry

(Concluded from page 19)

working wholly or in part on projects or programs financed by the Federal Government.

Under these conditions, it is obviously important that Government must try to avoid policies or procedures which may lead to inefficient deployment, building up one area at the expense of another, stockpiling, and so on. When considering the launching of big programs requiring large-scale research and development, the Government, in advance, should count the cost in manpower. We now are in an era when its decisions can affect small armies of scientists and engineers.

We urgently need more information about manpower utilization. So far we have had to make decisions based on hunches, intuition, or fragmentary data.

In this random list of problem areas, I come finally to the problem of achieving good management in all institutions, public and private, of our massive innovation industry. This need for good management becomes the more urgent in this period of transition when our rate of growth will probably be slowed and the problem of priorities, of responsible scientific choice, will become crucial. Which big project will we undertake and which reject or defer? How do we achieve a proper balance between basic research, which we long neglected, and applied research and development?

In the government these questions will have to be answered by both executive and legislative processes, but great responsibility must inevitably fall upon the science administrators and their advisers. Great progress has been made in recent years in creating the necessary posts, such as Assistant Secretaries for Research and Development, and generally upgrading the administrative competence available for handling the government program, but much remains to be done.

The Government faces a hard struggle to recruit competent technical, supervisory, and managerial talent. It constantly is up against a dangerous weakening of its management strength, largely because pay scales and personnel policies are inadequate and technically competent administrators are hard to attract and hold. Science administrators, managers who possess a combination of technological mastery and administrative skill, project engineers, and research directors—all these are extremely scarce today. More and better ones can do much to improve the Federal as well as the industrial Research and Development program.

I return, in conclusion, to my earlier surmise that we have an "untransacted destiny" in science. Unless we burke the chance, we may be ushering in a golden age with unexampled benefits for human welfare.

The United States, with the scientific strength it has built in the past several decades, has the resources and momentum to play a central role in this achievement—unless we have a loss of nerve or make decisions which hamper or dampen innovation. If we continue to evolve policies, especially government policies, which release the full creative scientific and technological potential of the nation, we have before us the power to shape a great society, a research-oriented society in which no man need work at less than his full potential and all men can have the profound experience of each being creative in his own way.

Institute Yesteryears

As recalled by the late H. E. Lobdell, '17

25 Years Ago

LIKE its four predecessors, the Institute's fifth Alumni Day, on June 5, took place under clear skies. The arrangements, which were entrusted to a committee chairmanned by *A. Warren Norton, '21,* appropriately provided for a morning Conference on "The Technology of National Defense." The presiding officer of the Conference was *Gerard Swope, '95,* President of the General Electric Company, and its speakers were *Charles Edison, '13,* Assistant Secretary of the Navy, and Louis A. Johnson, Assistant Secretary of War.

Following luncheon in Du Pont Court, the Briggs Field House—named for the late *Frank Harrison Briggs, '81*—was dedicated.

► The next morning at Symphony Hall, commencement exercises marked the graduation of the Institute's 72d class. Of the 614 degree recipients, 440 were bachelor's of the Class of 1939, of whom 24 simultaneously received the master's degree. The 174 who received advanced degrees alone were divided as follows: 30 doctorates of philosophy, 18 of science, and one of public health; five master's in architecture, one in city planning, and 119 of science.

The academic procession was led by *Alexander Macomber, '07,* who had been the 35th President of the Alumni Association in 1928-1929; and next came President Karl T. Compton and the commencement speaker, Sir Harold Hartley, Vice-president of the London Midland and Scottish Railway Company. At the head of the long procession of degree candidates marched *William F. Wingard,* President of the Class of 1939, and its three elected marshals: *Harold R. Seykota, Stuart Paige,* and *Richard S. Leghorn.*

► Faculty retirements as of June 30 included Professor *W. Spencer Hutchinson, '92,* Head of the Department of Mining Engineering, and Professor *Alpheus G. Wood-*

Gerard Swope, '95, in 1939.

man, '97, of the Department of Chemistry.

Professor Hutchinson's successor as Acting Head of the Department of Mining Engineering was Professor *Charles E. Locke, '96.*

50 Years Ago

ON JUNE 9, at Huntington Hall in the Rogers Building on Boylston Street, 313 diplomas were awarded to members of the Institute's 47th Class.

The 286 bachelor of science degrees awarded were divided as follows: mechanical engineering, 63; civil engineering, 57; electrical engineering, 46; chemical engineering, 34; sanitary engineering, 19; architecture, 18; mining engineering and metallurgy, 15; chemistry, 8; naval architecture, 8; electrochemical engineering, 8; biology, 6; general science, 3; and physics, 1.

75 Years Ago

PLANS were announced for the construction during the summer of 1889 of a new building, on Trinity Place. This structure, later known as "Engineering A," was to be 148 feet long and 50 feet wide, with five stories and a basement. It was to be of brick, with a sandstone trim, mill-type construction, and the estimated cost was $70,000. As noted in *The Tech,* "The entire drawings and design of the building [were] made by students of the Architectural Department under the direction of Professor Chandler."

100 Years Ago

VICE-PRESIDENT Jacob Bigelow presided at the 26th Meeting of the "Government," held June 26, 1864, in the absence of President Rogers who was on the eve of departure to spend the summer in Europe. It was voted to provide Dr. Rogers with the sum of £1,000 to purchase for the Institute "Models, Photographic Illustrations, and Apparatus."

James L. Little "observed that in consideration of the valuable services rendered by Professor Rogers to the Institute, and the continued interest manifested by him in its prosperity, and moreover as his projected European trip was to be made, in part at least, for the benefit of the Institute, it was proper that his travelling expenses should be borne by it."

M. Denman Ross "thought whatever sum the Government might appropriate for such purpose could readily be made up by voluntary contributions."

Charles L. Flint "moved to appropriate a Thousand Dollars towards defraying Professor Rogers' expenses while abroad."

James M. Beebe "suggested substituting Pounds for Dollars, as the actual amount intended would thus, in the present unsettled state of our currency, be more definite; and on his motion it was

"Voted, that the sum of £250 be presented to the President of the Institute towards defraying the expenses of his contemplated visit to Europe."

President Rogers declined to accept any reimbursement, and when the Treasurer, as directed by the Finance Committee, sent him at London a "Bill of Exchange" for £250, he wrote Mr. Ross a graceful note reading as follows:

"What you are pleased to say of the feelings of our friends in regard to my acceptance of this provision for my expenses is, I need not say, most gratefully appreciated. But I must continue, as at first, to decline to avail myself of this kind proffer, and shall therefore return the Draft . . . on my arrival in Boston."

Club News

Southern California Alumni Tour Chevrolet Plant

The spring social activities of the M.I.T. Club of Southern California have been varied and well attended. At an early spring meeting on March 18 the group toured the Chevrolet assembly plant in Van Nuys. The tour lasted two hours, and was conducted through the Fisher Body factory as well as the final assembly plant. We were able to inspect all the production processes operating at this facility, and were pleased with the attendance of over 100 Alumni and their families. Subsequent to the plant tour, a dinner meeting was held at the Sportsmen's Lodge in North Hollywood. John Kuyper, the plant manager of the Van Nuys facility, talked on the "Chevrolet Story."

On May 12 the club was to meet at the Space Technology Laboratories in southwestern Los Angeles and tour some of the unclassified areas of the plant. In July we are planning a train trip to San Juan Capistrano for a pleasant evening and dinner at a famous restaurant there. In the fall we plan to hold a formal dinner meeting with an outstanding guest speaker. Inquiries regarding membership in the M.I.T. Club of Southern California should be addressed to the secretary.—Arthur Schwartz, '47, Secretary, 8355 Blackburn Avenue, Los Angeles, Calif.

Delaware Valley Group Sees "Where's Charlie"

One hundred fifty members and guests of the M.I.T. Club of Delaware Valley in the Wilmington area, under the chairmanship of Vice-president Gilbert P. Monet, '43, sponsored an excellent performance of "Where's Charlie." The play was presented by an amateur group at the Breck's Mill Playhouse on the Brandywine Creek, and all proceeds went to M.I.T. Coffee was served before the show and wine was served during the intermission—this was a most enjoyable way for M.I.T. men to get together.—John B. Murdock, '41, Secretary, 15 Runnemede Avenue, Lansdowne, Pa.

New Hampshire Club Hears Professor Bryant

The annual meeting of the M.I.T. Club of New Hampshire was to be held on May 5 at the Nashua Country Club. A social hour, dinner, and brief business meeting were planned to precede a talk "M.I.T. as a Residential College," by Lynwood S. Bryant, Associate Professor of English and Master of McCormick Hall.—Robert E. Spoerl, '46, Secretary-Treasurer, 136 High Street, Exeter, N.H.

Washington Club to Hear Arms Control Director

The M.I.T. Club of Washington was to meet for dinner on April 29 and hear William C. Foster, '18, Director of the U. S. Arms Control and Disarmament Agency, speak on "Developments at the 18-Nation Disarmament Conference at Geneva." Election of officers was also scheduled for that meeting.

Washington area Alumni are participating in the regional solicitation program of the Alumni Fund.

A mule-drawn barge trip on the Chesapeake and Ohio canal during June or July is under consideration, and the evening of July 28 is the tentative date.—Paul M. Robinson, Jr., '44, President, 8009 Jansen Drive, Springfield, Va.; Richard R. Martin, '45, Secretary, 9308 Milroy Place, Bethesda 14, Md.

Ontario Club Meets With Harvard Group

The M.I.T. Club of Lower Ontario held a joint meeting with the Harvard Business School Club on March 19 at which Jay W. Forrester, '45, Professor of Industrial Management at M.I.T., was speaker. This was the first such joint meeting in Toronto of M.I.T. and Harvard Business School alumni, and was successful in terms of attendance as well as interest shown in Professor Forrester's remarks. Edward Peacock, '47, president of the M.I.T. group, introduced the speaker. This meeting closed the first active season of the Ontario group in several years. In view of the interest shown in the meetings, plans are now under way for a similar program next season.—Michael M. Koerner, '49, Secretary, 14 Ridgefield Road, Toronto, Ontario, Canada.

Class News

'91

Mrs. Thomas B. Carpenter died in her Buffalo home on March 24. She was one of a small group of women who left M.I.T. in 1891. Her maiden name was **Anne E. White.** On leaving Tech she went to Buffalo, got a job as a chemist with Schoellkopf Dye Works (today known as National Aniline) married Dr. Carpenter, a graduate of the Harvard Medical School. This small group of Tech women, of which Mrs. Carpenter was a charter member and the last survivor, made a real record for Tech education. Mrs. Carpenter is survived by Miss Charlotte Carpenter, a teacher in the Buffalo schools.—**William Channing Brown,** Secretary, 15 Forest Avenue, Hastings-on-Hudson, N.Y.

'95

Our class constitution calls for our annual meeting to be held for the election of officers, etc., at the same date in June as M.I.T.'s Alumni Day. This year it will be June 15, located as usual under one of the tents. We hope you will attend and enjoy it with us.—**Andrew D. Fuller,** Secretary, 120 Tremont Street, Boston, Mass.

'96

William E. Barbour answers a request for personal data; "My wife Mabel Ridgway Barbour (a staunch Christian) departed this life March 9, 1962, having attained the age of 86 years. I am blessed with five devoted children—three daughters and two sons. I am a member of the Presbyterian Church; the Society of Mayflower Descendents in North Carolina (six distinct ancestral lines of descent from Elder Brewster); charter member of same society in Connecticut and Illinois; former member of the Sons of the American Revolution, Illinois; sustaining member of the Virginia District of the Young Men's Christian Association of the southern area council; and of the Republican Party. As I see the future, supernatural help is needed to straighten out the difficulties that face the world to-day. Thanks for your kind words and the congratulations of the Class of '96 on that memorable day in my young life, 90 years old, April 1, 1964."

Myron Pierce has returned to Boston and Wellesley Hills after a winter spent in Florida. He made his 90th on April 8. After he mails his income tax reports and I mail these notes we will have lunch together and perhaps a word or two maybe for the July notes. The annual meeting of the class will be held at the Alumni Day Luncheon on June 15.—**James M. Driscoll,** Secretary, 129 Walnut Street, Brookline, Mass.

'97

News has been scarce in the past month except for obituaries, of which there are too many. **Frederic S. Atwood,** Course XIII, passed away in March. With Ballou, Hammond, DuPont and Wood, that makes five classmates reported during the winter, although two of these were delayed reports. . . . **John B. Taylor,** according to a '95 note, died in December, but due to some obscure cause in the Alumni Office, it has not been officially reported. Those of us who attended our reunion at Boxwood Manor, Old Lyme, Conn., the 30th or 35th reunion, will remember John's demonstration of control of light by sound waves. He was a real pioneer in physics. I am guessing that the failure of the Alumni Office to report his death is due to an I.B.M. computer or other cybernetic device running that office, to correct adjusting screw 2 x 2-1956, some weeks ago. This was replaced by a pair of VL3 semicarbide steel, instead of the proper 16-L3. My theory may be wrong, but one of the numerous heuristic individuals about should look into it; perhaps Professor Zacharias. . . . No member of '97 expects to be present at June reunion as of this writing. Best to all.—**George R. Wadleigh,** Acting Secretary, 70 Flower Avenue, Hastings-on-Hudson, N.Y.

'98

This is alumni month and the 66th Reunion for '98. We hope to see many of the boys with their guests here in Cambridge Monday, June 15. Some of us have passed on since the 65th, and we realize more and more each year the value of the friendship of classmates who continue to carry on with us. . . . We mentioned, in the May notes, receiving a personal news item from **Al Davis.** We are pleased to pass this on to you at this time. Perhaps it will be better if we quote him verbatim: "Living a rather solitary life as I do, there is but little that will be of interest to my pals of '98. My diversions are my workshop in the basement, bridge tournaments, a little chess and, too, the concoction of homemade charades, six samples of which I am enclosing. I realize, of course, that charades are démodé today but there may be a bare chance that one of these will please you. I have just given up driving my car (voluntarily); not that I do not enjoy driving but, because I have grown so forgetful and absent-minded, it seemed to be sound judgment for me not to crowd my luck but to stop while the record is clean. Have given the car to a fine young grandnephew who is just married and glad to get it. Hitherto, I have spent the summer up in the White Mountains but now expect to remain here the year round. Cordially, Alvan." The six charades which Al enclosed are brainteasers and show him to be well versed in mythology and ancient history. Here is, perhaps, one of the easiest; you will find the answer at the end of the notes. FIRST is for—Also an athlete quite popular today; NEXT is for—Afternoons, with chatty friends and gay; LAST is for—You and me, and the Latin words we say; ALL is for—Old Neptune's herds, and has the queerest way of being fire, then a flood, and then a beast of prey.

Not having heard from **Albion W. Shaw,** Course VI, for some time, we de-

Senior Executives

Robert R. Robinson, Fall '60, formerly Superintendent of the San Joaquin Division of the Southern Pacific Company in Bakersfield, Calif., has recently been promoted to Superintendent of the Sacramento-Salt Lake Division of the same company, at Sacramento, Calif. . . . **Samuel B. Burton, Fall '61,** who formerly held the position of superintendent of the Sacramento-Salt Lake Division of Southern Pacific, has been promoted to Assistant General Manager in the company's office in San Francisco. . . . **Edward J. Garvey, Fall '62,** formerly Director of Manufacturing Research of the General Products Division of IBM in Endicott, N.Y., has been promoted to Manager of Product Operations, Components Division, in East Fishkill, N.Y. . . . **Wade C. Morris, Spring '63,** formerly a Superintendent of the Southern Pacific Company in Dunsmuir, Calif., is now Superintendent of the San Joaquin Division in Bakersfield.—**Peter P. Gil,** Secretary, Room 52-455, M.I.T., Cambridge 39, Mass.

Happy Birthday

Birthday Congratulations are due during June to an alumna who will celebrate her 95th milestone, and to 1, 9 and 11 Alumni who will celebrate, respectively, their 90th, 85th and 80th birthdays, as listed below with dates of birth.

June, 1869—JANE B. PATTEN, '06, on the 8th.

June, 1874—CORA B. GROSS, '09, on the 29th.

June, 1879—WILLIAM R. CROWELL, '04, on the 2nd; HAROLD Y. CURREY, '02, on the 10th; BERNARD G. ELLIOT, '02, on the 19th; ROBERT B. PETERS, '03, on the 23rd; RAYMOND WILLEY, '00, on the 24th; HARCOURT W. BULL, '04, on the 25th; CHARLES BITTINGER, '01, on the 27th; RALPH P. GIFFORD, '02, on the 28th; and EDWIN E. NELSON, '02, on the 30th.

June, 1884—NORMAN P. GERHARD, '06, on the 2nd; JOHN A. DAVIS, '07, H. GORDON HAWES, JR., '10, and HOWARD L. MARSH, '06, on the 13th; ALLYN C. TAYLOR, '06, on the 16th; EDWARD KLOBERG, '08, on the 17th; SIDNEY T. CARR, '06, on the 18th; LOUIS J. KILLION, '05, and EMIL STEINBERGER, '05, on the 21st; ALLEN POPE, '07, on the 22nd; and MRS. ELEANOR M. O'CONNOR, '06, on the 27th.

cided to look him up. He and his wife are living at 73 Webcowet Road, Arlington, Mass. Were sorry to learn that he was recently quite badly injured by a fall on the stairs of the Haymarket Square subway station. He says, however, that he was fortunate in not having to be hospitalized. It was mainly because of this injury that he decided to semi-retire and give up active work as an insurance broker with Field and Cowles in Boston. Otherwise, his health is good. Having been in the harness for so many years, retirement does not come easy to him, but he keeps busy working around the house and at many other chores. He was treasurer for 29 years of the Hancock Church Men's Club (Congregational) of Lexington, Mass. We note that Albion is now one of the oldest class members and will celebrate his 89th birthday on June 12, only two days before the reunion. "Happy Birthday," Al, and hope we will see you and your wife at our Alma Mater on the 15th. . . . Answer to the charade:—Pro te us.—**Frederick A. Jones,** Secretary, 286 Chestnut Hill Avenue, Brighton 35, Mass.; **Edward S. Chapin,** President, 271 Dartmouth Street, Boston 16, Mass.

'99

Charles Rutherford Greenlaw was born in Boston on March 22, 1877, and died in San Francisco on November 23, 1963. He was a special student at Boston Tech and then went to Stanford in 1904. He was an engineer with A.T.&T., later transferred to the Pacific Telephone and Telegraph Company in San Francisco. About 1907, Charles homesteaded about 340 acres near Willets in Northern California. In El Collardo, his name for his favorite spot, he spent spring and fall for many years and enjoyed the sea breezes of San Francisco in the other seasons. After retirement in 1940 he devoted 20 years to preparing a history of his family, tracing it back to four brothers who came from Scotland in the mid-Eighteenth Century. To obtain the necessary data he traveled extensively and spent much time in letter writing and the preparation of charts. Charles was the oldest member of the Masonic lodge and cherished his 50-year membership pin. About 1956 he sold El Collardo and purchased a four-acre property in the lower Sierra Nevadas and engaged in vigorous exercise in improving his property and that of two of his brothers who lived next door. In spite of failing eyesight, he made various trips to many beloved spots. He was buried in the old family lot in Deer Isle, Maine. He is survived by three sons and a daughter. . . . By the time you read this I hope you have indicated that you are coming to our 65th Reunion on June 15. If not, do it now.—**Percy W. Witherell,** Secretary, 1162 West Street, Wrentham, Mass.

'00

News from any member of the class is so rare these days that any brief note is like a breath of spring. We recently received just a word from **Walter Rapp** of Cincinnati, Ohio, who says: "During the past few years I have been trying out a new stunt on my birthdays and have been deducting one year on these occasions so that now I have my family quite confused as to how many candles to provide on the birthday cake." We hope that he can so reduce his future cakes to a very small size. . . . . **Stanley Fitch** has been taking his annual trip to the West and South. A postcard in mid-March from Los Angeles says, "Have enjoyed my visit here with two grand-sons. Am leaving via jet non-stop for Tampa, Fla., and Fort Myer Beach. See you in April." . . . Another postcard from **Charlie Smith** from Athens, Ga.: "Here is something new in education. 148 luxury rooms, all with ample accommodations and baths, banquet hall lobbies, etc., where seminars are held without leaving the building. Elsie and I are attending a Civic Development Seminar after 2,500 miles in our Volkswagon through the southeast." The postcard is of the "Georgia Center for Continuing Elucation," on the University Campus at Athens.—**Elbert G. Allen,** Secretary, 11 Richfield Road, West Newton, Mass.

'01

I received a letter from **Phil Moore** telling of the death of **Arthur G. Hayden,** who was one of our prominent classmates. He was in his 90th year. Arthur had a distinguished career, professionally, and lived an interesting life when he retired. He held degrees of A.B. from Ripon College Class of '98, S.B. M.I.T. '01 and Honorary Sc.D. from Ripon awarded in 1951. He was active in various engineering organizations. His entire career was centered around structural engineering and design. After graduation he spent several years with American Bridge and McClintic Marshall. He then became assistant engineer, New York State Barge Canal. He spent about 15 years with the Barge Canal before becoming associated with the Bronxville Parkway Commission, where he was chief designing engineer, and, later, with the Westchester County Park Commission. During his connection with these commissions he developed numerous improvements in methods and design. His most interesting was the rigid frame bridge which permitted certain improvements in structure and economy in parkway construction. His book "The Rigid Frame Bridge," has been through several editions. When he came to this vicinity to live, he was very active until illness overcame him. He canoed on most of the rivers in this vicinity. He spent much time working in the woods near his house. In addition to his love of canoeing he was a fine swimmer. He was much interested in rowing. He went regularly to the races that were held on Lake Quinsigamund in which Clark University crews rowed. He was such a staunch backer of that crew that he was made an honorary member and presented with a rowing shirt and sweater. A fine family group survives him: his widow Florence; two sons and a daughter; 14 grandchildren; and five great-grandchildren.

I received a reply from **Allen McDaniel,** IV, whose original address was Waterford, Va., but who is now living in San Diego, Calif. His health caused him to make various changes in his plans. He has had experiences in one or two hospitals. He and his wife plan to come East this spring and, after attending to various

Deceased

MRS. THOMAS B. CARPENTER, '91, March 24*
GEORGE B. DE GERSDORFF, '92, Feb. 9
SAMUEL T. SMETTERS, '96, March 16
LINCOLN CROCKER, '97, March
JOHN B. TAYLOR, '97, Dec.*
JOSEPH C. NOYES, '98, April 14, 1963
CHARLES R. GREENLAW, '99, Nov. 23*
ARTHUR C. DAVIS, '01, March 9
ARTHUR G. HAYDEN, '01*
ALBERT J. LINDSLY, '02, Sept. 21
HERBERT L. SHERMAN, '02, April 7*
GEORGE M. WETHERBEE, '02, Jan. 21
F. CLARK DURANT, JR., '03, Dec. 27, 1962
CURRIER LANG, '04, March 18*
W. WALDO TROWBRIDGE, '04, March 6
MRS. CHARLES-E. A. WINSLOW, '04, Nov. 13*
ALFRED C. BEDORTHA, '05, Sept. 13
NORMAN LOMBARD, '05, March 19
LESTER W. BROCK, '07, July 2
JOHN R. KIBBEY, '08, July 18
WALTER W. KING, '09, March 3*
HAROLD W. CHURCHILL, '10, Jan. 31
PAUL BURDETT, '11, Jan. 31, 1963
CHARLES C. JONES, '12, Feb. 29
WILBUR T. ROBERTS, '12, Nov. 7
GEORGE E. LEAVITT, JR., '13, Jan. 21*
RHYS H. NORTH, '13, Jan. 20*
EDMOND W. BOWLER, '14, Oct. 28
MERRILL E. CHAMPION, '14, July
SAMUEL S. EISENBERG, '15, March 10*
LINDSAY C. LAMB, '15, Dec. 5
EDWARD E. PROCTOR, '15, March 28
HORATIO W. MAXFIELD, '17, Sept.
CHARLES B. SAWYER, '17, March 25
JAMES L. MCCLELLAN, '18, April*
FRANK P. FLETT, '20, Oct. 27
WILBUR H. FREEMAN, '20, Nov. 3
DON G. SHINGLER, '21, Oct. 29
GEORGE T. BAILEY, '22, March 27
HAROLD A. HADLEY, '22, April 4
BARRETT G. HINDES, '22, March 24*
BRYAN B. POWELL, '22, Dec. 2
EGON E. KATTWINKEL, '23, March 15*
WILLIS E. TEALE, '23, March 30
ONSLOW S. ROBINSON, '25, March 3*
THOMAS W. TUTTLE, '25, March 16*
TWITTY WHALEY, '25, Feb. 2*
WILLIAM E. HALFACRE, '26, March 25
R. WAYNARD VOSPER, '26, March 3
PUTNAM KING, '29, March 18
ALAN B. BURNS, '32, Dec. 11*
DON N. HIGGINS, JR., '33*
FRANK K. MACMAHON, '33, March 30
DONALD W. HAARMAN, '34, March 1, 1963
ALVA C. SAPP, '37, July 27, 1962
ROBERT E. SORENSEN, '47, Jan. 11
ALVIN B. BUCK, '49, Dec. 7
PAUL G. GOLDBERG, '50, Sept. 22, 1962
ROBERT E. GOODE, '52, Feb. 26
JOHN H. RUNYON, '55, March 19

* Further Information in Class News.

business matters, they will return to California and spend the rest of their days there. . . . The class has done very well in supplying me with news so far. Remember as our numbers grow smaller there is more responsibility on each one to do his part.—**Theodore H. Taft,** Secretary, P .O. Box 124, Jaffrey, N.H.

'02

Charles F. Gardner in a later letter to **Dan Patch** gave a little more information about himself than in the first. He has two sons. The older one was graduated in chemical engineering from M.I.T. and was drafted into the army in World War II. He served five years, mostly in the African campaign, coming home in an ambulance ship. The younger son was graduated from the Wharton School of Business Administration, University of Pennsylvania, and is now with a worldwide organization of accountants as a partner in charge of their Administration Service Division. Gardner contrasts his own meager social life at M.I.T. with that experienced at Penn by his son and feels that lack of such as M.I.T. was a great disadvantage in later life. . . . A postcard has been received from **John Marvin,** which he mailed in Manila, March 10. At that time he was about three-quarters through his cruise around the world with Hong Kong and Japan ahead of him. He undoubtedly is home now (mid-April). . . . A card from the **Colliers** in Florida said they had been at Miami for a fortnight, **Arthur** had called on the **Lew Moores** at Vero Beach and would visit the Gulf Coast before returning home. . . . **Emanuel Gorfinkle** has a new address: 500 Dedham Street, Newton Center, Mass.

The Boston Herald reported the death of **Herbert L. Sherman** on April 7 last at Chevy Chase, Md. Bert was one of the youngest members of our class, born November 11, 1881, at Kingston, Mass. He prepared for M.I.T. at the Cambridge Latin School and made his home in Belmont. He began his professional career immediately after graduation as a water analyst with the State Board of Health, but when the fall term came he returned to the Institute as assistant in mineralogy under Dr. Warren. Early in 1903 he became a chemist with the Helderberg Cement Company at Howes Cave, N.Y., but that September returned to Boston to work as cement tester and chemist for the United Shoe Machinery Company, which was erecting its plant at Beverly. In April, 1904, he set himself up in Boston as an analytical and consulting chemist specializing in building materials. Later he and **Robert S. Edwards,** joined forces as Sherman and Edwards; from 1908 until 1914 Sherman was alone. In 1914 he consolidated his interests with those of the Pittsburgh Testing Laboratories under the corporate name of New England Bureau of Tests, Inc. and served as president. In 1919 Sherman became associated with A. D. Little, Inc., in charge of the department for testing and inspection of structural materials, including cement, concrete materials and so on.

In 1921 Sherman, Hervey J. Skinner, '99, and Dr. Esselen (Harvard, '15) associated themselves under the name of Skinner, Sherman, and Esselen, Inc. and set up offices in Boston as industrial engineers and consultants. They acquired a going laboratory through the purchase of the Boston Biochemical Laboratory founded by M.I.T. Professor S. C. Prescott, '94 (with whom **Burton Philbrick** was associated). This new firm, under the name of Skinner and Sherman, Inc., (Esselen having withdrawn after a few years) operated successfully for about 30 years on Stuart Street, Boston, with Sherman taking an active part and serving as treasurer. After retirement he took up residence in Sea Island, Ga., but after a few years removed to Chevy Chase, Md., where he resided at the time of his death. He is survived by his wife, Mary C. Sherman; a daughter, Mrs. John R. Earl of St. Paul, Minn., and a son, Robert F. Sherman of Boston, children by his first wife, Adaline S. Sherman. Memorial services were held in Belmont on April 11—**Burton G. Philbrick,** Secretary, 18 Ocean Avenue, Salem, Mass.

'03

A year has passed since our highly successful 60th Reunion that left us with long lasting memories of familiar scenes and associates in the hallowed halls of Old Rogers. Our rugged group of members still holds about 87 strong, and under the paternal guidance of our chaplain, **Jim Welsh,** we will "live to live" for continued enlivening reunions. A recent review of our '03 50th Reunion brought forth such interest, and we reported parts of the 55th Reunion in the May issue. A few more details of classmates' activities at the time of the 55th are also in order. **"Sophie Thayer Blunt** related experiences in Braintree Town Meeting affairs in which she was able to bring about some desired town improvements. . . . **Robert King** also keeps his hand in community affairs in Norwalk, Conn., and is a booster for M.I.T. . . . **Tyrell Cheney** keeps busy with the Wilton, Conn., Planning Commission. . . . **Arthur Allen** is active in local affairs and in keeping tabs on his grandchildren. . . . Numerous community, fraternal and men's church activities keep your Secretary from easy-chair habits.

"Three more classmates joined us at the Alumni Luncheon on Monday. **Tom Sears, Stanley Foster** with his daughter, and **John J. Nolan.** We were all thrilled with the encouraging reports of Institute affairs by Dr. Killian and Dr. Stratton. An interesting tour of the new projects on campus was announced, with the Alumni Dinner and Pops Concert to wind up the day. Now for our 60th!"

Jay B. Simon, III, has a new address at Apt. 108, 1055 Sherman, Denver, Colo. . . . Our Happy Birthday wishes go to **Arthur L. Derby,** XV, on March 30 for his 80th milestone, and to **Omar S. Swenson,** IV, on April 26, and **Mrs. George H. Noone,** IX (Ava Marcella Stoddard) on April 29, for their 85th birthday anniversaries.—**John J. A. Nolan,** Secretary, 13 Linden Avenue, Somerville, Mass.; **Augustus H. Eustis,** Treasurer, 131 State Street, Boston, Mass.

'04

It is with great sorrow that we report the passing of three of our classmates. Our class president **Currier Lang** passed away on March 18 at his home in Norwalk, Conn. He will be greatly missed, for ever since he served as first marshal at our graduation he has taken a prominent part in class affairs. He was also active in community affairs in Norwalk, where he was chairman of the hospital trustees for a period, member of the Y.M.C.A. directors, police commissioner and chairman of a nonpartisan community group for suggesting ways to improve the city. In all of these services he made an impressive record. Flowers were sent to his funeral services on behalf of the class and a very appreciative letter was received from one of his daughters. . . . **Mrs. Charles-E. A. Winslow (Annie Rogers)** passed away on November 23, 1963. You may remember Professor Winslow as an associate of Dr. Sedgwick at M.I.T. for a time and later at Yale. . . . A belated report gives the death of **Frank E. Raymond** at Salem, Mass., in August, 1960.

Now for a more pleasant item. The American Institute of Mining, Metallurgical and Petroleum Engineers has voted to designate a small but distinguished group as fellows of the society. Among the first group of nominees for this designation is our classmate, **Bob Sosman.** Congratulations, Bob. . . . This number of the Review should be in the mail by June 1. This is the last call for you to notify the class secretary regarding your intentions for reunion participation. Hop to it.—**Carle R. Hayward,** Secretary, Room 35-304, M.I.T., Cambridge 39, Mass.; **Eugene H. Russell, Jr.,** Treasurer, 82 Stevens Road, Needham, Mass.

'05

We are still in Texas enjoying the wonderful weather and the hospitality of **Willard Simpson.** He is so busy in the office and with Masonic, civic and charitable work that we see him mostly on weekends. I could write volumes covering his work in these areas, but must confine it to a story he has just told me. It seems that during his early days at M.I.T. he asked **Bob Lord** to show him Bunker Hill. Bob confessed that he had never been there. "I'll take you," said Willard, and he did. They climbed to the top and Bob pointed out points of interest. A few years after graduation, Bob was in San Antonio and looked Willard up at his office, right in the heart of the downtown and historic area. Bob said he would like to visit the Alamo, Willard confessed he had never been inside for long. Bob said "I'll take you" and he did, which proves that a native takes many things for grant-

ed. These notes will be written at home in New Hampshire next month. Texas is a grand state, and Texas hospitality is wonderful.

I have just received a notice that the **Andy Fishers** had a 50th Wedding anniverary at the Putnam Chapel of the First Church, Roxbury, Mass., on Saturday, May 2. There was a reception and Quahog Chowder Supper, and if you ever tasted one of Andy's quahog chowders, you will be sorry I did not have the notice in time so that you could have planned to attend. I hoped to, but because of the difficulty of changing reservations on these special round-trip, man and wife, mid-week rate tickets, there was a question as to whether we could make it. I am sure you will want to congratulate the Fishers with a belated card. The address is 6 Copeland Place, Roxbury, Mass. 02119. . . . You will be interested in a letter from **John Damon,** VI, sections from which I quote: "I do hope to make it for our 60th. I am climbing back very slowly. I hit bottom in September, 1960, from the effects of the encephalitis virus I got in Korea. No bounce when I hit bottom, but the will to crawl back is still there and the progress so far makes me think I can make it in another year. My doctor says 'give me a couple of years more' and he will have both my legs and my head working well. My son is still taking good care of me and making a nice home for me. We hope to finish our second cabin cruiser (a 36-foot boat) by next June." Thanks, John, and keep a stiff upper lip. Perhaps you will sail that boat to Boston next June. To the best of my knowledge, John served in two wars, both voluntarily. What a man!

Sid Caine, XIII, writes: "as to myself I am busy with church duties and soon will be able to be outdoors taking the pulse and blood pressures of things I have planted. A two weeks' siege of arthritis two years ago has stiffened up hip joints a bit so that they need a dose of goose & ease and graphite every so often, but I can navigate (Course XIII—editor's joke) not too rapidly on my own feet without props, crutches or wheel chair. I grab The Technology Review when it comes and turn first to your notes, spotting the names of classmates who have died. It makes me think of the dear old Boston ladies, meeting for tea: "Well, girls, let us see who died—in the Boston Transcript." I am very glad you included excerpts from Mrs. (**Julius**) **Furer's** letter. **Gib Tower** and I took the XIII-A Course under Captain (retired U.S. Navy) Hoffgaarde, who was then called Naval Constructor from Annapolis. Admiral Furer was in that class. It gives me a rather warm feeling that you have rubbed elbows with a man of his ability. I don't think much rubbed off on me."

Gilbert Tower, in commenting on his town meeting turning down his ideas for a one-man planning board, says that their plans for trips, World's Fair, and so on, depend upon getting a babysitter for "Mama" (Elizabeth's grandmother) "who is fine at 101⅔ years old." Cheer up Gib, the planning board at home, of which I was a member, was slammed down on their 'progress' articles. . . . A letter from his daughter tells of the death of **John A. Meggison,** VI, of Galena, Kansas. I quote: "It is with deep sorrow that we must write of the death of John Alexander Meggison. He was proud of M.I.T. and never failed to appraise the potential abilities and interests of the boys in our area. He retired in 1949, but kept in touch with engineering matters and changes. He died on March 15, 1964, just 18 days before his 82nd birthday." Up to a few years ago, I had had considerable correspondence with John and know that since retirement he traveled very extensively in religious work.

There are two changes of address to report: Captain **Clayton M. Simmers,** XIII-A, has moved from Washington, D.C., to B. Building, Apartment D, 820 South Washington Street, Alexandria 14, Va.; **Edward L. Davis,** II, is now living at 45 Warren Street, Newton Center, Mass.—**Fred W. Goldthwait,** Secretary, Box 32, Center Sandwich, N.H.; **Gilbert S. Tower,** Assistant Secretary, 30 North Main Street, Cohasset, Mass.

'06

How he came by it he didn't say but along in April **Stew Coey** sent me a large clipping from the Youngstown Vindicator of February 16, 1964. It has five large pictures taken in the recently opened Arms Museum of the Mahoning Valley Historical Society, of which **Jim Wick** is president; and its address is 648 Wick Avenue. One large picture shows Jim holding a rolling pin used by Polly Potter, second wife of Turhand Kirtland, an agent for the Connecticut Land Company, who, with John Young, laid out Youngstown in 1798. Mrs. Arms left the property and contents of her home to the Historical Society, which had previously housed its collection in the Public Library. (That's where the Wellesley Historical Society collection is now located, in the Public Library lower floor, awaiting suitable permanent quarters.) Incidentally it's a good likeness of Jim and as Stew commented "gives you a picture of how Jim Wick is using his spare time." As reported awhile back, the Coeys are planning to move to Wilmington, Vt., and build there. They were busy in April showing to prospective buyers the house in Glen Ridge that had been home for over 40 years. They plan to attend Alumni Day on the 15th, so why don't you plan to join us there and then?

For years the Alumni Association has issued a yearly directory which lists the officers, past-presidents, Council members and its committees, etc. Among the Educational Counselors there were at one time several '06 men. In the current directory there is only one—Stew Coey—among the 792 counselors in the 49 states (all but Alaska and some day there will be an Eskimo, maybe.) Currently there are also 37 counselors in 22 foreign countries. Seems to me that M.I.T. was among, if not the first, to set up such a staff of scouts, at first called Honorary Secretaries; a tip-o-the-hat to Stew for the many years he has thus helped M.I.T. to get the "cream of the crop." Also among the groups listed in the directory is an Honor Roll—the 50 oldest alumni as of October 1, 1963. Fourth on the list is Miss **Sarah E. Potter,** VII, who will be 100 in August 15, 1965. Near the middle of the list is Miss **Jane Boit Patten,** VII, S.B., who is four years younger.

The class was well represented at the March 30 Council meeting, with **Sherm Chase, Chet Hoefer,** and yours truly present to hear President Stratton and Professor Greeley, Director of Admissions, tell us about the students, grads and under-grads, and off the record, how M.I.T.'s "productivity" compares with other institutions, scientific and Ivy League. They made us feel a lot of pride in what was Boston Tech. . . . Sherm and Bertha can feel a lot of pride in the many professional honors that have been awarded to him through the years. He was recently made an honorary member of the Boston Society of Civil Engineers, the oldest engineering society in the United States. Two other younger Tech men were also made honorary members—Gordon M. Fair, '16, XI, and Thomas R. Camp, '25, I. Sherm deplores the dropping of the course in Sanitary Engineering when there is such a widespread need for its grads, with river and tideland pollution, diminishing water resources and lowering water table, effect of pesticides on "fish and fowl," etc. . . . **Chet's** wife, Ruth Ella, with one of their two daughters spent five weeks in Greece last fall. . . . The day after that council meeting I phoned our President **Jim Kidder** to tell him about the meeting—and ask how he was getting along. He gets around with his cane and son Gordon takes him farther afield. Jim and his sister Mollie carry on. Jim had joined me at such meetings in previous years. . . . In a February reply, **Allyn Taylor** agreed that "we shall miss Percy and Annetta." The Taylors were spending their usual (for six years) winter vacation in St. Pete and reported that they were enjoying their "usual good health." . . . Another welcome letter was from **Sid Carr** announcing that the house in Menlo Park had been sold, as on May 14 they would move into a new "Condominium" retirement home, Carmel Hacienda, in Carmel, Calif. I wondered what a condominium might be and soon after I found the answer in the real estate section of the Boston Herald where that editor explained how it differed from a Co-op, in which ownership is through shares in a trust or a corporation, whereas in a "condo," ownership is through a deed.

Harry Fletcher's wife sent us a much-appreciated Easter card with a message to say she was sending a couple of booklets from the Philadelphia office of the Field Service, U.S. Department of Commerce, where Mary is a secretary. Published by the Department of Health, Education and Welfare, the interesting booklets were entitled "Modern Science and Your Child," and "Modern Mathematics and Your Child." The Co-op-o-Gram sent with them gives some startling statistics about various sections of U.S. population, especially the number in different age groups of

children, number over 85, etc. If interested, write to 1015 Chestnut Street. . . . A shock came early in April when I spotted the death notice of **Carroll Farwell**'s wife, Alice (Sargent), who died April 6. They have three daughters, all of Sharon. A letter of sympathy has been sent to Carroll for the class. . . . One change of address is that of Miss **Jane Patten,** from Eliot Street in South Natick where she had lived these many years, to 30 Pleasant Street, still in South Natick. . . . Let us know whether or not you will be on deck the 15th on campus, by writing to me.—**Edward B. Rowe,** Secretary-Treasurer, 11 Cushing Road, Wellesley Hills, Mass., 02181.

'07

This is being written the first week in April, and I have really learned how much I look forward to getting The Review early each month. So far, my Review for March and April has not been delivered. A call to the Review Office brought out the fact that some of the class secretaries had been overlooked, or not included, in the computer figures for Review deliveries. If any of the men are missing their copies of the Review, please let me know; and I will go looking for them. . . . I have had a great deal of pleasure in trying to collect the present request for dues sent out in January. As of April 10, "the Kitty" is purring to the amount of $459. Still a number of our old reliables have not been heard from. The number of personal notes I received was most encouraging. Some of our class members who have never donated or written to the secretary or treasurer before came across in grand style. To all who made over a $5 donation I wrote a personal note of thanks. They truly deserved it.

In the November, 1963, notes, I mentioned Miss **Bertha I. Barker,** VII, as having celebrated her 95th birthday. I sent congratulations to her as being our oldest '07 member. The middle of March I received notice from the Alumni Office that she had passed away last November. We never learned what her connection with '07 was. . . . A letter and follow up post card from **Carl Bragdon,** X, contained interesting family information. In January, Carl was hospitalized for an operation to cure jaundice. Complications set in so that he had to return for further treatment but is now well on the way to complete recovery. Carl has three daughters, the oldest, Patty, being employed in the records room of the New Rochelle Hospital where he was confined. His second daughter, Casey, attended some of the '07 luncheons at our 50th Reunion and became acquainted with many of the fellows at this reunion. His third daughter, Nancy, is married to a lawyer serving as the legal adviser to the Commissioner of Yukon Territory in Canada. They were all home with him during his illness. Carl is looking forward to celebrating with his wife a 55th wedding anniversary in the early summer. His eldest granddaughter will be a third generation Smith College graduate in June.

S. Gilbert Emilio, III, wrote a few lines on the bottom of my letter to him when he sent me his dues check. "Am not retired or tired. Working regularly a 40-hour week for peanuts and the fun of it. Main idea is to be of some use. As practically a volunteer worker, I am property mapping for the town assessors (Gilford, N.H.), all indoor work. My older son, Luis V. Emilio, II, '36, seems to have retired, however, and is now growing walnuts by the ton in California." . . . When **Ernest Altgelt,** I, takes his pen in hand, he writes a very long and interesting letter, although some parts of it are in true Texan style and not suitable for reproduction for the staid pages of The Review. Ernest's first love is A & M University; second love, University of Texas; and lastly, M.I.T. He always manages, however to have some money left to send to the '07 treasurer. He writes: "The older I get the more I enjoy reunions. Last May 2, 3, and 4, I went to the A & M Reunion, where we welcomed the class of 1913 and initiated them into the 'Sul Rossers'(?)."

You will receive this copy of The Review early in June. Alumni Day is to be held on June 15; so you will have time to make a reservation to attend if you have not already done so. This is an urgent appeal on my part to get as many '07 men and their wives as possible to attend at least one of the Alumni Day functions. Tables are reserved at both the noon luncheon and evening banquet, so we can be sure of sitting together. The evening entertainment with Arthur Fiedler and the Boston Pops Orchestra is, in itself, worth the entire price of admission. —**Philip B. Walker,** Secretary and Treasurer, 18 Summit Street, Whitinsville, Mass.; **Gardner S. Gould,** Assistant Secretary, 409 Highland Street, Newtonville, Mass.

'08

Alumni Day this year is Monday, June 15. We hope you will be there. There is lots to see and hear; you shouldn't miss it. You will also see many of your classmates and friends in other classes. Ladies are invited. It is not too late to make a gift to the 1964 Alumni Fund. If you have already given, a second gift will certainly be appreciated, and will help in reaching our goal.—**H. Leston Carter,** Secretary, 14 Roslyn Road, Waban 68, Mass.; **Joseph W. Wattles, 3d,** Treasurer, 26 Bullard Road, Weston 93, Mass.

'09

Just as last month, we have received no news items from members of the class to include in these notes. You all must have received **Molly**'s presidential letter in which he portrays quite completely the situations relative to both the Alumni Fund and the reunion. We hope that many will follow his suggestion of sending more personal news to the secretary for these class notes. As stated earlier, the Reunion Committee is preparing the material to be mailed to members of the class, and it surely will have been received by you before these notes. However, be sure to reserve the dates June 14 and 15, to come and bring the members of your family.—**Chester L. Dawes,** Secretary, Pierce Hall, Harvard University, Cambridge 38, Mass.; Assistant Secretaries: **George E. Wallis,** Wenham, Mass.; **Francis M. Loud,** 351 Commercial Street, Weymouth 88, Mass.

'11

It is a dark rainy day in April and time to write Class News for the June issue of Volume 66 of The Review. However, the only correspondence I have in my folder are two notices of changes of address from the Alumni Office. One reports the semi-annual migration of the **Norman Duffetts.** This spring they are back in Niagara Falls after a winter in Lake Worth, Fla. . . . The other is a new address for **David E. Bartlett,** who has moved from Laconia, N.H., to 705 West Bradley Road, Milwaukee, Wis. 53217. . . . I wish you a pleasant summer and hope to see a few of you in Cambridge on Alumni Day. It will be very helpful if you can co-operate by sending some material to help keep our column alive.—**John A. Herlihy,** Treasurer and Acting Secretary, 588 Riverside Avenue, Medford, Mass. 02155.

'12

A post card from **J. Pratt** in Mexico says that Priscilla has been attending Girl Scout International Meetings and that they will go to Acapulco for three weeks, after which they would drive back to Chicago. . . . A letter from Mrs. **Taylor Roberts** gives a short history of Taylor's overseas service. In 1942 he went with the 34th Engineers and was engaged in building airfields. In 1943 a bomb burst shattered his eardrums, and he was sent to a special ear hospital for treatment, being discharged in July, 1944, as a lieutenant colonel. . . . He had been in a nursing home for five years before his death and Dorothy made a daily trip to be with him. He is buried in Arlington National Cemetery.

A note from **Gene Marceau** in St. Petersburg says that he is active in working on the M.I.T. Alumni Fund Drive. He remarks "if they don't look too prosperous, I don't push too hard." . . . **Carl Rowley** is still active at architectural engineering and is now at work on a plant for the True Temper Corporation at Amory, Miss.—**Frederick J. Shepard, Jr.,** Secretary, 32-A Chestnut Street, Boston, Mass.

'13

"Take Me Back To Tech on a Special Train to the Glorious Institute." Well, we do not care whether you come by train,

aeroplane, automobile, streetcar or walk, but join us at the Institute on Monday, June 15, 1964, for Alumni Day. You all have received the program and advance notices, so arrange your vacation or any other trip to New England to include at least a day at M.I.T. We shall be waiting to greet you and yours. . . . It is with great reluctance that we must report the deaths of two of our loyal classmates. A letter has been received from Mrs. Katharyn Leavitt: "Sadly I must write that my beloved husband, **George E. Leavitt, Jr.,** died on January 21, 1964. Proud he was of M.I.T. and grateful for the kind of life it enabled him to live. A quiet, upright man of gentle strength, whose home and family meant much to him . . . it has always given me great happiness to see so many of his wonderful characteristics carried on in his children. It is surprising how empty the spaces left in the home, church and community by one who quietly accepts and does each task as it comes." What a wonderful tribute, Sister Katharyn. All of us of 1913, M.I.T., offer our heartfelt sympathy to you and your children. . . . By way of the Alumni Office, we have received a few bare facts regarding the death of **Rhys H. North,** 105 Faigle Road, Portsmouth, Va., January 20, 1964. North, as most of you may recall, was art editor of the 1913 Technique. He has always been a loyal member by correspondence and by paying class dues. We regret that we have seen very little of Rhys during the past few years at our reunions, for unfortunately North has been unable to attend due to the opening of his art school in Maine in the latter part of June (yearly). If any of our classmates have further information of our departed friend, we shall be very glad to elaborate in future notes. To Rhys' family we offer our most sincere sympathy.

Well, needless to say, our old buddie **Bill Mattson** surely had spring fever on March 20 as he wrote us a very interesting letter, and followed it up with a supplementary on the 25th. As you were informed in the March issue of The Review, Bill and **Bunny Brett,** two of the Founders of the national Kappa Sigma fraternity chapter at M.I.T., were among the speakers at the Founders' Day Banquet and testimonial to James B. Fiske, M.I.T. Alumnus, "Man of the Year" of Kappa Sigma, and president of Bell Telephone Laboratories. Bill and Jo certainly lead eventful lives in the Rockies, Bill as the chairman of the Jefferson County Red Cross chapter, and precinct chairman of the Republican Party in Golden (or is it Denver?), while his charming wife is a director and president of the auxiliary of the Denver Society for Crippled Children, together with other social activities. Bill does not miss his former associations much(?). He chides your secretary when the Class News are not more voluminous than those of the younger classes. Your help is needed to satisfy Bill. You send in news, and we will publish the Class News. Bill also includes a sketch which he cut out of a magazine and with his comments. It portrays in Bill's words: "Well! Well! Well! This is a sketch of the average member of the Class of 1913, M.I.T. Retired and tired, sitting on 'the Old Camp Chair' with his umbrella for the rainy day that may never come. Exhausted from his 50th Class Reunion—doing nothing of interest—waiting for something to turn up—and too lazy to write his Class Secretary? Too conservative to continue his gifts to the Alumni Fund. Well let us hope not." Well, we hope not, too!

Our **George R. Wallace, 3d** is still making money for his company as well as making the Boston Herald with a picture taken in Fitchburg buying half dollars—not Ben Franklins but John Kennedys. . . . Your scribe has noted the demise of two old Tech friends: Donald DesGrange, a fraternity brother of the Class of 1914, and Francis Scully of the Class of 1915, with whom we had luncheon last summer as guests of **Lammy Lamaire.** To the familes of these two departed friends, we share their grief and offer our condolences. . . . We were glad to hear briefly, although a trifle late, from **Frank Achard, Arthur Howlett, Charles Smith,** also the corrected address including zip number from **Lindsley Hall.** The result of a poll made or received from 98 classmates as to preference of year and place to celebrate an interim reunion shows 56 members voted, 26 for 1965 and 13 for 1966; 4 questionable; 13 not interested, also 28 voted to go to the Cape, while 10 are in favor of holding a reunion in Cambridge or vicinity; further, two would be present wherever a reunion will be held. Those of you who forwarded your dues but did not vote could still change this preference vote, or maybe there are other classmates who have not sent in the 1963-1964 yearly dues who would be interested in an interim reunion in either 1965 or 1966. The Capen Family enjoyed a week of Roman holidays which will long be remembered as "The Ides of March," when Janet Capen was married to Raymond Theodore Ruder on March 7 in New York City. We had been informed by Bill Mattson that our dear friend **Larry Hart** spent a short period in the hospital following a fall at his home. While in New York we enjoyed a very pleasant telephone conversation with both Larry and Arry. Larry has recovered nicely and by now must be back to his usual enthusiastic normalcy. Even our astronauts have had trials and tribulations since returning to terra firma.

It has been quite a revelation to your secretary to receive the many reports from loyal boosters who assisted in contacting our many classmates and affiliates in connection with our 50th Reunion. **Fred Lane** forwarded a letter which he received from **Harry Lake Bowman,** who graduated from Penn State in 1911, received his master's degree at Tech in 1913-14 but by some turn of events has been classified with 1913. Further, Bowman in 1919 to 1926 served as instructor, assistant professor, and associate professor in structural engineering at M.I.T. His son, Edward H., Class of '46 is now an associate professor in Industrial Management at the Institute. H.L. in 1926 became professor of civil engineering at Drexel Institute in Philadelphia, later dean of engineering, then dean of the faculty. Since 1961, he has been dean emeritus and an academic consultant (7 days a week, usually). Well, Harry, the Class of 1913 is honored to have you as a member in good standing, and we missed you at our 50th. . . . **Allen Brewer** also forwarded a very interesting letter from **Ralph T. Alger.** Ralph graduated from Harvard with a A.B. degree in 1912 and spent a year with us at M.I.T. He would have been present at our 50th except for a tricky heart and also was unable to attend his 50th reunion at Harvard. Because of ill health, he retired to Florida in 1954. We still think his heart is in the right place as he enclosed a check showing his interest in the affairs of M.I.T. '13. Was our 50th Reunion a success? Letters like these make your secretary's efforts really rewarding. Why don't you 1913 readers sit right down and write a letter of your activities, yes, even of your sins. So endeth this really wonderful year and is the beginning of our second half century. We shall be back in the fall with more and more frequent vigor and news. We know you will too. Just a few changes of addresses: **Manuel Font,** Box 218, Roosevelt, Puerto Rico; Dr. **John A. Gann,** 5825 Shawnee Drive, Lake Worth, Fla.; Dr. **Frances H. Achard,** Experience Associates, Inc., 825 Beacon Street, Newton Center, Mass. 02159; **Robert B. Nichols,** 30 Avon Road, Binghamton, N.Y.—**George Philip Capen,** Secretary and Treasurer, 60 Everett Street, Canton, Mass.

'14

It is exactly two months from the closing date for these notes to Alumni Day, which will be preceded by our 50th Reunion. To our class, this is of great significance. Due to the illness of his wife, **Charlie Fiske** was in Boston this spring so we took that occasion several times to discuss reunion matters. Fortunately Marie has improved so that Charlie and she returned to Bath, Maine. Most unfortunately, however, just after April 1, Charlie had a stroke. During it he fell and broke his shoulder. **Herman Affel** and I have both inquired whether Charlie could be visited at the Bath General Hospital, but were told, not yet. We can only hope in this interim that he will fully recover and will be with us again at the reunion.

Ray Dinsmore has already sent out the final notice of our 50th Reunion. There are always a few who are unable to make final decisions until just before the reunion on whether or not they can come and how much they will be able to include. This is just a reminder and also a quick summary. Headquarters are to be at the Charter House Hotel, Five Cambridge Parkway, Cambridge on the Charles River. Rooms should be engaged well in advance. The first formal event will be commencement at 10 A.M. in the Cage on Massachusetts Avenue, directly opposite the Institute. 1914 classmates will be supplied with caps and gowns, regardless of whether they were graduated. Reserved seats will be held

for ladies and also those classmates who do not desire to be seated with the class on the stage. The luncheon will be catered and complementary. Tickets must be obtained in advance from Fred G. Lehmann, Room 1-280, both for ladies and classmates. . . . Friday evening will be a joint affair at the Charter House Hotel. Those who are arriving Thursday should reserve rooms as soon as possible. While not a formal class dinner on Thursday, there will be many present and the dinner space has been reserved. Saturday night will be '14's stag affair; the ladies will be at 100 Memorial Drive. Sunday will include a luncheon for ladies and classmates at the Dedham Country Club. All events for Alumni Day, Monday, are to be paid through the Alumni Day Committee and not through 1914. There will probably be many with questions, and I can be reached at my apartment, telephone number TR 6-5236.

Homer Calver has been in Mexico again this spring, but he is now back to work again. He is a consultant in Public Health for the Population and is preparing an article on "The Role of Public Health in the Population Crisis" to be delivered as a speech in Puerto Rico. He is also consultant to the American Public Health Association. . . . There are many of our class who have been listed as '14ers because they took some special courses at the Institute for a year or only a term. Most of these men have indicated that they are not interested in taking part in class affairs. Many of them, however, did become acquainted with classmates in a particular course. For this reason, your secretary tries to report items about these special students. Unfortunately, the news we have to report is the death of **Merrill Edwin Champion,** Course VII, last July. Throughout his life he was a public health officer, principally in Massachusetts. After retirement, he took up special work at the Harvard Museum of Comparative Zoology, in the Department of Mollusks.—**H. B. Richmond,** Secretary, 100 Memorial Drive, Cambridge 42, Mass.; **Charles P. Fiske,** President, Cold Spring Farm, Bath, Maine; **Herman A. Affel,** Assistant Secretary and Class Agent, R.F.D. 2, Oakland, Maine; **Ray P. Dinsmore,** Reunion Chairman, 1 Overwood Road, Akron 1, Ohio.

'15

Our class has suffered a hard loss in the sad passing of **Sam Eisenberg,** who died suddenly March 10 at the Beth Israel Hospital, Boston. We here, who saw Sam and his two sons, Gene, '43, and Herbert, '52, regularly at our Boston and New York Class Dinners and at our five year reunions, find it hard to believe he is gone. We remember his personable manner, his rich sense of humor and his inimitable dialect stories. Active, devoted and generous in all class and M.I.T. activities, Sam was intense in his loyalties and staunch friendships. A serious student of international affairs, he was unafraid to face the future, but was greatly concerned over the chaos and troubles all over the world and longed to see all people at peace with one another. He gave a great deal of himself to civic and community affairs, but still had time to devote to the arts, particularly music and painting. He enjoyed an unusually compatible home life with his wife, Ida, their married daughter and two sons and their many grandchildren, always a proud boast for Sam. Sam entered M.I.T. from Chelsea (Mass.) High School and took Course IV. He became an outstanding architect in Boston and his firm designed many schools, colleges, public buildings, housing projects and municipal developments in New England and the Boston area. Appointed to the Zoning Board of Appeal for the City of Boston by former Mayor John B. Hynes, Sam also served as a consultant and writer for the New England Real Estate Journal. He was a member of the Century Club, American Institute of Architects, Massachusetts Association of Architects, Boston Association of Architects, The Boston Architectural Center and the M.I.T. Stein Club. Jim Hoey, President of Gene Eisenberg's Class of '43 attended Sam's services in Boston with our class representatives. The rabbi's eulogy was a glowing and well deserved tribute to Sam's interests, spirit and gentle nature. We're sure Sam would have said for any of his classmates "Olav Hasholom"—May he rest in peace.—**Azel W. Mack,** Secretary, 100 Memorial Drive, Cambridge 42, Mass.

'16

Our alphabet-loving president, **Ralph Fletcher,** starts us off this time with a message about you-know-what! Says he: "On June 12, 13, and 14, we will meet at the Chatham Bars Inn in Chatham on Cape Cod to celebrate our 48th Reunion. This has been a great location for us, and the arrangements with separate cottages and a couple of choice rooms in the main house has worked out nicely. Let's hope that good weather will once again permit the scheduling of a New England Clambake at the shore's edge. Also remember that there is a nice nine-hole golf course as a part of the hotel property, and it offers an interesting test to golfers and duffers alike. From all indications in correspondence and personal contact, there will be another large turnout of classmates and their ladies. We hope that you will be with us. Sometimes it may seem like a great deal of effort for a weekend on the Cape but this isn't just an ordinary weekend, and we always enjoy ourselves and benefit from it. All best wishes and I look forward to seeing you."

Ralph tells about picking up a copy of the Boston Sunday Herald early in February just as he was leaving for a ski-bit in Switzerland: "What a pleasant surprise it was for me as we winged our way across the Atlantic to read the tremendously interesting article about **Izzy Richmond** and his recommendation regarding the location of the World's Fair in Boston in 1975." The article is to be on the Reunion Bulletin Board—come see! . . . Every month or so, it seems, if we just look around, there is a picture of some '16er doing something—doing, that's the word! Now the picture of the month is one of **Steve Brophy,** at ease, smiling, and in good company, as told by the caption: "Benefit Aides: Thomas D'Arcy Brophy, Mrs. Richard J. Kins, center, and Mrs. Helen Wadel plan two fashion-show-luncheons that will be held Easter Sunday, March 29, at the Plaza Hotel. The proceeds will go to the Association for Crippled Children and Adults of New York State, which is an Easter Seal Society." The picture accompanies an article in the March 10 New York Times, Forwarded by **Joe Barker** with the note: "Did you happen to note this?"; The article starts like this: "Two Bonnet Shows March 29 to Aid Easter Seal Unit; Plaza Benefits to Raise Funds for Association Helping the Disabled. Bonnets past, present, and future will be modeled in the Persian and Terrace Rooms of the Plaza. . . . Tickets for the luncheon in the Persian Room, where a review of bonnets from 1890 will also be shown, are available. . . ." Steve and Jessie Brophy are listed among the members of the benefit committee. See the picture on the Reunion Bulletin Board.

A letter from **Bob** and Pearl **Wilson** in mid-March from Houston, Texas, told of their continuing motor trip from Florida to we-think-it-is Phoenix. At that particular moment Bob was flying to Dallas for the day to attend a meeting of the National Petroleum Council. Earlier in March, they had left their car in Mobile, and had returned by train to Washington for nearly two weeks, then back to Mobile by train. Pearl mentioned they were interested to read in the column about the thrill Katherine McDaniel had, staying at a "schloss." She notes: "In '59 we had luncheon at a castle which had been occupied (and greatly damaged, alas) by the Russians during World War II. It is now the property of the Anthropological Society and used for seminars. Was bought for them by the late Wenner-Gren (Swedish, I think) and restored at a cost of about $100,000 or more. It cost him—together with over 1,000 acres—$25,000. From a balcony one had a 180 degree view of a beautiful valley and mountains." . . . In the line of old memories, we asked **Maynard Guss** if he had known one of our old Course VI buddies, **Eddie Ekdahl** (deceased, 1953) in Shanghai after World War I, for Ed was there for some years with Amos Bird (powdered eggs). Way back then we arranged to send him parts for a two-way radio system, ship to shore, with VT-2 vacuum tubes (war surplus) at $8 apiece, and he in turn over the years had 8 or 10 silk shirts made up for us in Shanghai at $3 apiece. Such quality—nothing like it here then for $10! Maynard says he was in China 1916 to 1941, lived in Shanghai from 1920 to Pearl Harbor; the name of Ekdahl is familiar to him, and he probably met him at the Tech Alumni Club in Shanghai.

We have had such a collection of enthusiastic responses from those who have read the few **Irv McDaniel** letters that have been circulated, it is hard to resist reproducing all of them, but we will give

only some of the more recent ones. **Obie Pyle:** "We are happy to have read these letters." **Don Webster:** "Irv and Kay are rare geniuses in their way." **Blythe Stason:** "These have been most interesting and informative letters. I am glad to have been on the mailing list." **Kem Dean:** "Thanks Harold—found these interesting and well written." **Stew Rowlett:** "I do think Irv's letters should appear in print—a series in the New Yorker for instance." **Emory Kemp:** "Second the above statement by Stew." **Frank Ross:** "I like them too." Well over a year ago Irv gave us the results of his searching analysis of the night clubs of Europe and the Orient, but this past year he has been spending more time on matters of art, especially in the European art centers. He ran into all extremes. One of the last exhibits he visited on the continent was in Bologna late in October. Hammond's World Atlas refers to Bologna as "a noted art, educational, and cultural town." Whereas other visits to museums and exhibits had dealt primarily with the classical, the old masters, this, in contrast, was an exhibit of modern art, and he writes: "The utmost in modern art! The Grand Prix winner—1963—Bologna, 'A Composition of . . .'" Wait, we'd better save this for the reunion; after all, it's only a few days off. He says: "Whether it was a local (which I assume it was) exhibit, I do not know—also I don't know if it was an annual or monthly exhibit." He and Kay are coming to the reunion all the way from Newport Beach, Calif. Kay also has her 50th at Simmons. We hope Irv can again show some slides of their many travels.

Stew Rowlett bubbles over with delight with do-you-know-what, and wouldn't-you-too? Nothing less than a visit from **Dina Coleman** all the way from Lexington, Ky. Stew says: "He was in town one night so came out to spend a couple hours over a bourbon and snack. It gave me a great lift to talk over old times and old friends. Wish more '16ers would come by." (His address is 1177 South Duncan Avenue, Clearwater, Fla.) He also had a call from **Bob Wilson,** who was staying one night in town, hoped to stop by for a visit, but couldn't make it. As for busyness, Stew says: "Am still 'messing' around with portrait painting. Doing better but will never be a Sargent or Peale. We have taken no exciting journeys to far places. Will probably have to visit our kids and their families around the country. Can't stay away too long 'cause my roses and other plants run wild if I don't tend them." . . . **John Gore** adds his bit of encouragement for all this '16 writing we do. He retired a seemingly-short time ago from Beechnut in Canajoharie, N.Y., where he contributed, we feel sure, to endowing Beechies with a quality that gets top rating in our household. John continues very active in Boy Scouts in his area. He was president of the Council for five years and is now chairman of the Trust Fund Committee, member of the executive board, and member of several committees. He is now delving into local history, and is learning that his Mohawk Valley is second only to Boston.

The **Hovey Freemans** took a two-and-a-half months' trip, starting in January, mostly by ship, 'The Bergensfjord,' from New York, then the Panama Canal, Philippines, South Sea islands, Thailand, Hong Kong, Japan, Hawaii to San Francisco, then by jet home. We are sure the enforced rest did Hovey a lot of good, and too it gave him an opportunity to report a few items like this: "We went to the Galapagos Islands, then on to the South Sea Islands. The Hula girls were fascinating. Of course I am getting too old, but my wife tells me I didn't fall asleep watching them. I might add as a sidelight that I took 900 pictures which came out very well! . . . We were the first cruise ship to ever stop at Zamboanga in the South Philippines and they put on a royal celebration for us. The schools were closed and over 1,000 school children met us at the dock. The interesting sidelights here was that they did not want any trouble while we were there so the day when we were to be there the chief of police had 'invited' 5,000 trouble makers to spend the day in jail. They are very anxious to get the tourist trade and so are doing everything they can to make it attractive." They found North Borneo fascinating, discovered why so many in the Fiji Islands have reddish hair, heard where the money was coming from for the new beautiful buildings and highways in Thailand, and rediscovered Hong Kong as the shopper's paradise for clothing. "In Japan," Hovey says, "people were all very friendly. They have taken up the idea that maybe the atomic bomb was a good thing—that it will bring world peace—an interesting thought." And in Hawaii: "Waikiki Beach is being spoiled by too much of the Coney Island hot dog type, but the Bikinis on the beach are worth watching and the surfboarding was fascinating." Perhaps Hovey will tell us more at the reunion!

Ted Strieby writes from Los Angeles where he and his wife are visiting their son. They had just returned from a month in Peru—"not working, just fun." They visited many of the old Inca ruins, "saw some of the marvelous 20,000-foot mountains, and the colorful Indian people who live there . . . Near the coast, it is very hot and there is practically no rain—just sandy desert or dusty mountains, except where rivers come down and are used for irrigation as in Inca times. The mountains east of the continental divide have plenty of rain with jungles at lower altitude, but lush farms with wheat, corn, and potatoes up to over 14,000 feet. A wonderful experience." . . . A card from **Herb** and Vi **Mendelson** at the end of March tells this story: "This card cannot possibly do the Taj Mahal justice; taken at sunrise. How it was possible to conceive such a dream edifice in the first place and then to erect it and carve the marble [completed in 1648]! Much of the interior white marble is inlaid with agate, jade, moss agate, onyx, topaz, lapis, etc., fitted with toolmakers accuracy. Best to everybody. We are off to Japan tomorrow." . . . And speaking of Japan, a card from the **Bill Leaches** in March said: "Have had a nice trip through Japan—no cherry blossoms yet." Their "marvelous trip" included some experiences: "We were on the ship that rescued the 18 seamen; also we were in a monsoon in the China Sea."

Jim Evans continues active in substitute teaching in math and science in the Paterson, N.J., High Schools. As you know, he has always been one for "give and take"—this, we submit, may be the fundamental reason why he is now going to school himself, two nights a week, as a student in woodworking. If you need anything in the cabinet-maker line, even advice, just get in touch with him at 2531 Fair Lawn Avenue, Fair Lawn, N.J. Jim supplies us with classmate news from his correspondence. **Don Webster** tells Jim he and Nell have been leading "very dull, very quiet, very circumspect lives, having hardly been 10 miles from the house since November 20," the day of Nell's "heart do." And: "no parties, no heel kicking whatsoever." But later, we have had direct information that Nell has so improved that the Websters took off from New York on April 10 for a 17-day Caribbean cruise. And what ship did they take? 'The Bergensfjord', the same one that Hovey and his wife took from New York to the Orient, and left in San Francisco on their way home! Small world! And good food, good liquor, and a wonderful crew, says Hovey! Regarding their trip, Don writes: "Tried to get Nell to go to the eastern Mediterranean to straighten out the Cypriots, but she says that's a little more doing than she can take at this point." Jim forwards a card from **Ralph Fletcher** in Davos, Switzerland, showing three speeding skiers in clouds of snow dust; Ralph's message: "All okay, but guess which, guess who" and then a lot of initials! Jim includes a February clipping from the Falmouth newspaper, with a column heading: "Mrs. **(Howard) Claussen** in Oxygen Tent, But Improving"; she was taken to the Cape Cod Hospital when she was stricken with a severe attack of asthma. All is well again. And **Dave Patten** in a letter to Jim indicates he is now circulating well again, following last year's partial encasement with plaster and steel pins. He is looking forward to this summer's challenge for the America's Cup, as a guest of the USN from a destroyer grandstand. Further: "The Navy, by the way, played host to some of us here in Boston on 28 January, with a session at Quonset Point on ASW and the presence of Red subs off our shores. After a fine lunch we boarded a new missile ship for anti-submarine warfare demonstrations, winding up at Newport Naval Base. Of special significance to me, at the C/T party to revive the less hardy voyagers (the wind hit 60 and 70 mph in gusts of sleet and snow), was to meet up again after 20 years with Admiral Hoyle, aid to the commandant of the Naval War College. As three stripers in the Aleutians in 1943, we shared some of the experiences that area presented both from the action of the enemy and the Devil. As a Navy flier he piloted me safely over some rough going, and the Bering Seas were no strangers." Dave also adds a bit of wisdom on political matters: "Let us return to the system of balanced government of this nation, and recall that wise bit from Plutarch: 'The real destroy-

er of the liberties of the people is he who spreads among them bounties, donations, and benefits'." . . . From Daytona Beach, **Ed Williams** writes to get the address of **Frank Ross** in Naples, Fla. And why? For a good reason; here's what Ed says: "I would like to congratulate him on successfully completing his second round of the Coronary Course."

Peb Stone tells of mass production in winter on a dairy farm in New Hampshire: "Fifty or so bovines turn hay and grain and silage into milk and fertilizer to make more hay and grain and silage, etc. Very scientific and automated—milking machines feed into collecting pipes that carry milk untouched by human hands to cooling tanks and hence to collecting tanks by pump. Each cow's production is recorded at each milking, and sent to the Holstein Association Computer together with data from all other Holstein dairies. Enormous volumes of data are sent back to all members. After some 250 days of milking the cows call it a day. . . . The fertilizer is collected at the source by conveyor belt and dumped into waiting trailers, which, when full are tractored to the fields and spread even as sand on sandpaper. But I'm glad I have a nice dirty machine shop for my hobby." The Stones fly to Europe April 25, to visit places and places in Italy, Switzerland, Germany, France, and England. Peb says: "Hope to get some pictures with my latest extravagance—single lens reflex, telescopic and wide angle, electronic flash. Bet the slides aren't as good as Dolly gets with her $25 Kodak but I will have more fun fussing around."

Early in April we had a letter from **Hy Ullian** from Bal Harbour, Fla., where he and his wife keep a "small year-round apartment" so that they can "catch some sun at intervals during the winter." In fact this was their fifth trip down from Boston since October; two of the times they went by way of California in order to visit their son "who is teaching at the University of California and serving as consultant to a research firm." Hy is still active head of his own firm, and often finds it necessary to return to Boston because of his wife's activities at Radcliffe, where she is currently first vice-president of the Alumnae Association. They expect to be at the reunion.

Brad Curtis had his first retirement in 1956 after 31 years in public utilities. Then, because of heart trouble last year, June, 1963, became what he calls his second retirement date. He had been teaching electrical machinery and electronics for seven years at Newark College of Engineering. He says: "Our family consists of two girls both of whom are married and have children. Grandchildren: two boys and two girls. The oldest grandchild is in second year at Beaver College in Glendale, Pa. As for philosophy—well, I do not have much to offer here. For recreation I like sailing very much. Have at present a 23-foot sloop at Barnegat Bay. Have sailed in Long Island Sound and also on the north shore of Massachusetts. Right now my activities are somewhat limited, which I hate to admit." . . . And what do you think is the most recent development for **Earl Mellen?** Hint: think of Fletcher, Patten, Mendelson! Right! As Earl puts it: "I broke my right arm at the elbow—skating—no sympathy from anybody!!" We know he didn't want us to urge Jim Evans to contact a dozen or so asking them to send get well cards, but we do hereby send mass sympathy. His writing looks just like what he says: "Just learning how to write again." But he still keeps busy on various boards and committees; the latest additions to the non-salary list are: vice-president, Hospital Service Plan of New Jersey; chairman, Millburn Short Hills Planning Board; president-elect, Newark Rotary Club. Nice going Earl, but tell them you have to take time out for the reunion on June 12, 13, and 14.

And another New Jerseyite always busy, always in a key position on key issues, that's our **Leonard Best.** Last fall he was chairman of the Citizens Committee that opposed a huge state bond issue and his efforts were outstandingly successful. Now he is finance chairman of the Committee for State Tax Reform in New Jersey, a movement that is strongly supported by an impressive number of organizations. What is needed, according to the committee, and needed in 1964, is the enactment of a broad based tax, not inflexibly dedicated to a specific purpose or purposes. Since this all depends on voluntary contributions, any '16ers (or '15ers, '17ers, etc.) can easily take part by contacting Len Best, 211 Mountain Avenue, Springfield. . . . And so our story comes to another close. Two or three last minute letters will have to be reported in the July issue. It is now just a matter of days until the 48th Reunion, so, as the man on television might say: fly northeasterly, drive on down, to Chatham Bars Inn, Chatham, in the southeast corner of Cape Cod. For last minute decisions, call Ralph Fletcher on 617-251-4031.—**Harold F. Dodge,** Secretary, 96 Briarcliff Road, Mountain Lakes, N.J.

'17

The only chance for a class get-together this year is at the Alumni Day activities at the Institute on June 15. If you have not already signed up, make a last minute decision to swell the ranks of '17ers who will attend. . . . **Dick Lyons,** Regional Class Vice President writes as follows from Houston, Texas: "Technically, I am considered to be retired although I maintain a downtown office in Houston and carry on activities mostly in the oil and gas business. Additionally, I serve on various boards related to education, health and charities. When possible I am a gardener, featuring azaleas . . . The job from which I retired at the end of 1960 was that of president of Union Texas Natural Gas Corporation (successor company to the Union Sulphur Company, which was incorporated by the ingenious Harman Frasch and associates in January, 1896). In the early part of 1962 the company became a division of Allied Chemical Corporation. Regular vacations had not been on our schedule for many years, so Sammie and I finally started last September on our first voyage to Europe. We spent eight weeks visiting France, Italy, Spain, England and Ireland in that order. Much of our time was spent in and around the capital cities at places which are favored by most sightseers to those countries, but we also made a few tours to the country in France, England, and Ireland. We enjoyed the trip immensely and plan to go to other parts of Europe this year . . . An interesting diversion out of Paris was a tour of the castles along the Loire River, visiting structures erected in widely different periods, from ancient strongholds, dating back to the 10th and 11th Centuries to luxurious castles built in the 17th and 18th Centuries . . . En route to the Loire Valley, our first stop was at the famous Palace of Versailles. Further along, we visited the magnificent Cathedral of Notre Dame at Chartres, well worth the trip from Paris just to view its unusually beautiful blue windows . . . The area through which we traveled southward is flat to rolling country supporting a rich variety of crops, fruits and flowers. In this fall season the farmers and their wives were busy at the harvest, working into the dark, even on Sunday. In contrast to the mechanized farm equipment in the U.S.A., heavy two wheel carts drawn by unusually large and strong horses are still in vogue in France . . . We spent two nights in the village of Chenonceaux, east of Tours, at the Hotel Ottoni, having very satisfactory accommodations. Chenonceaux has a population of approximately 300. Inside the village church is a plaque bearing the names of 28 who lost their lives in World War I. It was of interest to note that many of the names on the plaque are duplicated on the list of employees of Union Texas in South Louisiana . . . In the city of Tours, located on the Loire, are some striking contrasts. Not far from a modern high-rise apartment is a large outdoor market on the bank of the river, patronized on Sunday both by city folks and country folks and where, in addition to the products of the soil, a wide variety of household articles may be purchased at reasonable cost. We wanted to get close to the people and this market place afforded the opportunity.

"In the Loire Valley, within a few miles of each other, in a wide variety of types, are dozens of castles. Many, begun in the 10th and 11th Centuries, are grim strongholds of feudal days, though some of these have been rebuilt several times. The style of construction and reconstruction changed, following the time when the progress of development of artillery had outdated the need for massive castles or fortresses. Langeais, one of the oldest castles in France, was a fortress at the end of the 10th Century. Chenonceaux, originally a fortified castle, has the unusual characteristic that it straddles the river Cher which flows through arches between supporting pillars standing in the river bed. The two story main gallery extends for sixty yards across the river. The restored Villandry castle is set in an elaborate array of well trimmed 16th Century style gardens. The single room

which may now be visited contains an exhibit of Spanish art, mostly in dark shades. The castles of the 15th and 16th Century period were erected when this region of Touraine was the playground and hunting grounds of kings, queens and nobles. Many are the stories of love-life and intrigue which took place in these castles . . . From Tours we drove up along the east bank of the Loire to Blois and then to Cheverney, one of the finest chateaus in the valley. Of a later period, Cheverney was begun in 1634. The interior is elegantly decorated and furnished throughout, preserving the 17th Century style. Not far away is Chambord, the largest castle in Touraine, colossal in appearance and having about 400 rooms. It is a fortified castle situated on a plain. The surrounding forest of Chambord is likewise immense, a portion of it being a deer park . . . On the return to Paris, we stopped briefly at Orleans, visiting its old cathedral and viewing the statue of Joan of Arc. I have received pleasure in writing these notes of the trip to the castles because of reliving a part of our first trip to France."

Professor **Richard D. Fay,** Emeritus Professor of Electrical Communications at M.I.T., who has made major contributions to nonlinear acoustics and to underwater sound, was the author of an article in Sound magazine in December, 1963, with the title "Underwater-Sound Reminiscences: Mostly Binaural." The following are excerpts: "Early in the year 1917, the Submarine Signal Company suggested to the U.S. Navy the desirability of establishing an experimental station at which to study the possibilities of locating submarines by means of underwater sound. The Navy gave its blessing to the proposal and there was formed a group comprising personnel from the General Electric Company and the Westinghouse Electric Company as well as the Submarine Signal Company. Nahant, a land-tied island near Boston, was chosen for the site of the station, chiefly on account of geographical advantages. I was chosen as engineer in charge of the station, chiefly because of my knowledge of the local area. The first listening device to be installed was a Fessenden oscillator mounted on a tripod offshore at a depth of 90 feet and connected to the station by a cable."

We record the deaths of two '17ers, **V. Bruce Davis** of Pembroke, N.H., and Dr. **Charles B. Sawyer** of Eastlake, Ohio. Bruce Davis was a special architectural student in 1917. His business career was with Hutchins and French, Bank Architects, Boston, as a junior partner, and later with Stone and Webster Engineering Corporation on the "X" (atomic bomb) project. He was 72 years of age. . . . Dr. Sawyer was president of Sawyer Research Products Company of Eastlake, Ohio. He was 73 years of age. He had a B.A. degree from Yale in 1915. He received his Ph.D. at M.I.T. and was instructor of heat treatment from 1917 to 1919. In the first World War he was a second lieutenant of infantry. After graduating from M.I.T. in 1921, he founded the Brush Laboratories in partnership with **Charles F. Brush, Jr.,** his roommate at M.I.T.

Enos Curtin has taken on additional activities. He writes: "At present, I am active on the Shering Committee for the Hall of Free Enterprise at the World's Fair. U.S. industry is showing what America makes, and we hope the Hall of Free Enterprise will show what makes American industry. I am also on the Executive Committee and Treasurer of "Operation Sail" which hopes to bring 14 square-rigged naval training ships from Norway, Denmark, Germany, France, Portugal, Spain, Indonesia, Chile, etc., to New York in July, 1964. I hope to get a ride up from Bermuda on one of the ships." . . . A newspaper clipping has been received announcing the election of **John A. Lunn** to the board of directors of the Spencer-Kennedy Laboratories. The notice states: "Lunn is also director of American Research and Development Corporation; Laboratory for Electronics; Baystate Corporation; United Research and other companies." These are a few activities, in addition to those listed in last month's notes that help to keep Al out of mischief. . . . The March 5 class luncheon in New York brought together Al Morton, Dix Proctor, Bill Hunter, Dick Loengard, Joe Littlefield, and the class secretary. . . . The class secretary has two extra copies of the 30th Anniversary History of 1917 which he will be glad to send to anyone who would like to have them.—**W. I. McNeill,** Secretary, 107 Wood Pond Road, West Hartford, Conn. 06107; **C. D. Proctor,** Assistant Secretary, P.O. Box 336, Lincoln Park, N.J. 07035.

'18

The two essentials of a well lived life are wings and roots. Roots are anchors. Wings are to carry us on flights of creative energy, or to distant places for the renewal of a fine urgency of feeling following long exertion. **Sax** and Louise **Fletcher** flew to Florida to "soak up a bit of sun and to catch up on some reading at the same time. Sometime in May we will be back at the farm (Greenfield, N.H.) for the summer, and will try to get together. The last time I saw you, you were with the Peterborough Players summer theater taking the part of a bilious old grouch in the last act of Saroyan's 'The Time of Your Life.' " During his reading, Sax ran across a copy of the February 22 Newsweek, part of which he sent me. It concerns an article titled, "Long Pull at Geneva." The 17-nation disarmament conference there seems to have lacked the wings to get it off the ground. It may, however, prove to be a starboard bower for peace. Remember that the talk about the test ban took five years, with an annual budget now running about $850,000, before Washington and Moscow reached agreement in principle. The treaty itself was put together in about 10 days. What intrigued me most in the article is a two-page picture of the short Semyon Tsarapkin, open-mouthed and empty glass in hand, talking to the tall **Bill Foster,** whose glass is much smaller and whose silent, aristocratic bearing would have done credit to a Roman emperor.

Speaking on March 6 at the National Press Club in Washington, Bill voiced confidence that progress will be made this year. Because of its doctrinal differences with China, Russia does not want to appear too eager for a new arms control agreement, and there are impelling reasons why it would like to freeze nuclear weapon development at the present level, stop further production of fissionable materials, and prevent any expansion of nuclear missiles or rockets. All of this has been proposed by our side. Bill said that throughout the Geneva talks the Russians maintained a friendly attitude toward the American suggestions in private, no matter how strident the public utterances. They want the arms race to stop as much if not more than we do, but feel dangerously exposed to the overwhelmingly superior power of the United States. Bill did not mention this, but meanwhile both sides are undoubtedly engaged in a crash program to develop the death ray known more scientifically as laser light. Its potential capacity to destroy life at great distances may well extend to the destruction of approaching missiles and aircraft or to the melting of a nuclear installation by a plane flying at great heights. Such a weapon will make obsolescent junk out of much in the present arsenals. Meanwhile, we also have television reconnaissance satellites passing over Russia several times every 24 hours, endlessly picking up a multitude of details concerning what goes on. It sounds as though sensible people have outlived war.

The true springs of Bill's character manifest themselves in many little ways. Consider, for example, his taking the time, despite a backbreaking responsibility to all mankind, to write, "I noted **Pete Sanger**'s passing, was saddened by it, and was reminded of the debts which our class owes to him for his many services." He also appended a word of approval and encouragement, seconded by some class secretaries, for a few words in the 1918 April notes.

June is traditionally the month of weddings, events which usually have wings and should grow roots. **Al** and Stella **Grossman** enlivened our reunion last year by celebrating their 40th anniversary on June 7. The class gave them a box of candy and a book so they could read if they got tired of increasing their cholesterol with an intake of chocolate. Title of the book, "I Could Go On Singing." . . . **Sam Chamberlain,** who for three decades has lived in a house built in Marblehead 262 years ago, now has some 45 books to his credit. Sam has brought "Bouquet de France" up-to-date. He would like to go back, but if he did he would not be able to eat all the delicacies offered to one who writes so attractively about the French cuisine. He recently spent four summers in England, searching out the beauty spots to photograph and sampling the splendors of English gastronomy. On the street in Edinburgh Sam ran into **Julie Howe** and his wife, but he didn't tell me that the Gourmet Magazine had given him a farewell party before he left for England. Save for the

probing curiosity which a reporter needs in order to uncover an entire story, we would not have learned of the New York Herald Tribune article concerning his trip, nor of the 23,000 miles he traveled around the British Isles for a series of articles which appeared in the Gourmet Magazine. Sam has two lovely daughters; one a food editor and the other a laboratory blood technician.

John Kilduff says he is in the same old rut. Maybe he's thinking of the roots of his mind being occupied by the presidency of the Amesbury Metal Products Company which manufactures airport lighting equipment, marine search lights, stainless steel fixtures for research laboratories, and other lesser articles. But the wings of his heart reach a long way from the hilltop where he lives overlooking the Merrimack River. John was the Division Three head of the M.I.T. Second Century Fund and made an outstanding job of it. The Institute's effort to get alumni contributions up to a million dollars a year has him as a regional director who, like Hercules searching for the golden apples of the Hesperides, cannot always know where to find the precious metal. As though this were not enough, John bends a herculean shoulder to cleaning the Augean stables of Massachusetts politics, if you know what I mean. His great love, however, is his daughter Jeanne, now wife of Edward Lanpher, '49. They live on a 25-acre farm in Hampstead, N.H., have three daughters, and own a business manufacturing rare organic metal compounds which are difficult to produce because so explosive they must be combined under dry ice. . . . In the fall of 1962 **Jack Kennard** tore up his roots at the Bell Labs where he had been assistant director of outside plants. He lives in Summit, N.J., rejoicing that he can now stay up until 2:00 A.M. reading a book, with no necessity for winging off to the office in the morning. He keeps busy trying to help handicapped people. Otherwise he reads history, contemporary novels, goes fishing and plays golf. These (so he says) constitute all he ever really wanted to do: "All else was performed under duress." Ida Mae says he's wonderful at getting breakfast since he no longer has to get to work. In November, 1962, they celebrated his retirement by taking a Caribbean cruise. Cuba was encirled by the U. S. Navy at the time, so the ship did not land there. As a consolation prize the passengers gave Jack a party to celebrate his 43 years rooted at Bell Labs and his successfully reaching age 65. Where he is this May I do not know. A year ago he was fishing with a guide in Laurentide, Canada, while his wife stayed with friends in Brewster, Maine. He said the mosquitoes were bigger than anything New Jersey can produce. So were the trout.

Courtesy of Edward B. Rowe, '06, a clipping from the Boston Herald has come announcing the death of **James L. McClellan.** Jim did a thesis on the "Action of Aqua Regia Upon Kitones." His career as a paper research chemist started in Yorklyn, Del. Then in 1929 his New England roots brought him back to West Groton, Mass., where he was busy with research for the Hollingsworth and Vose Company. The last 19 years of his professional activity were devoted to the Croker Burbank Paper Company of Fitchburg. Among Jim's scientific achievements are the development of the world's thinnest paper, and a virtually indestructible paper for maps used during World War II. He had put down his final roots in Hancock, N.H., but took final wing on Thursday, April 2, leaving a widow, two sons (one M.I.T. '42), a daughter, and nine grandchildren.—**F. Alexander Magoun,** Secretary, Jaffrey, N.H.

'19

As of April 7, reservations for our June reunion were coming in well, and the following names should be added to the list published in May of those coming: Harold F. Marshall, Daniel C. Hall, Edgar F. Seifert, Everett F. Doten, Jacob Lichter, Milton A. Loucks, John Stevens, James G. Strobridge, Leslie A. Jackson, Dean K. Webster, Maurice H. Role, Francis A. Weiskittel, Maurice E. Goodridge, and William F. Bennett. We also have word from Chatham Bars Inn that they will make arrangements for those of us who would like to play golf at Eastward Ho, one of the fine golf courses of New England. I hope that those of you who cannot attend will send in lots of news which I can convey to your classmates attending reunion. . . . The new address for **Marshall Balfour** is South Kent, Conn.—**Eugene R. Smoley,** Secretary, 30 School Lane, Scarsdale, N.Y.

'20

I hope to report the usual satisfactory turnout of classmates on Alumni Day. Our quota in recent years has been 20 from '20 and last year we exceeded that number by a goodly margin. Now that class reunion is only a year away, it behooves us all to keep in touch and miss no opportunity to round up the clan for what should be the most enjoyable gathering in '65. What we lack in numbers is certainly made up for in the quality of our illustrious clan. . . . At this writing, **Perk Bugbee** had just returned from his trip to Australia, Hong Kong, Japan, and Hawaii, making copious speeches, telecasts and broadcasts in the interest of international fire prevention. By Alumni Day he expects to be in Helsinki or some equally remote portion of the Continent, again on N.F.P.A. business. He appears to thrive on these strenuous activities. . . . Another classmate who will be across the water at that time is **Al Wason.** He and his wife are celebrating their 40th anniversary by a tour of England, Holland, Germany, Switzerland, Italy and France. Now that an increasing number of us have time for travel or other pursuits concerned with living, not just making a living, it would be appreciated if you would take a small portion of that extra spare time, if any, to inform your classmates, via the secretary, as to your changes of scene or activity. Perhaps your experiences will prove helpful to the rest of us. Certainly they will be received with interest, appreciation and understanding since we are all in or getting to be in the same boat. Do let us hear from you.

Josh Welch has moved from Menlo Park to San Jose, Calif., address 225 West Brokaw Road. . . . **Jack Bartholomew** may be found at 270 Berkshire Road, Cleveland Heights. . . . **Frank Maconi** is now in Holliston, Mass., at 65 Northway Street. He is an active member of the (M.I.T.) 128 Club. . . . Let us all pull together, boys, and make our 45th the best year ever.—**Harold Bugbee,** Secretary, 21 Everell Road, Winchester, Mass.

'21

Last call for Alumni Day, 1964, on June 15! Come to Cambridge for the day and enjoy the outstanding program of events which M.I.T. always presents with such a nice admixture of interest, education and sheer enjoyment. Come visit with the large group of your classmates and their wives,—the regulars who never fail to be there, and the increasing number of additions each year, who thereafter join the ranks of the regulars. If you haven't received the detailed program, write or phone the Alumni Association to get a copy and also your tickets for luncheon, dinner and the special concert in Kresge Auditorium by Arthur Fiedler and the Boston Pops. Let us know if your Secretaries can be of assistance. Act now and give yourself and your wife a day of fun and fellowship back at Tech. . . . Television is improving. It has discovered the Class of '21. Last month, we reported on a video program which showed **Irv** and Ruth **Jakobson** aboard the famous "Bounty" of the movies, sailing from Jake's shipyard to the New York World's Fair. The "1921 TV Man of the Month" for this issue of The Review is none other than **Ernest Henderson,** Board Chairman and Chief Executive Officer of the Sheraton Corporation of America. Ernie appeared on a new CBS program, "Celebrity Game," and was a most gracious celebrity. We were particularly interested in the wide range of his hobbies, which he gave as photography, coin collecting, composing music and ham radio. The last named will come as a pleasant surprise to **C. Wentworth Richards** of York Haven, Pa., who recently inquired whether there was anyone in this versatile class who "pounded brass" or whatever modern appellation has been adopted by the ancient worshippers of the Wouff Hong and the Rettysnitch. (Note for **Chick Kurth:** What happened to the Wouff Hong awarded to us by the late Hiram Percy Maxim, '86?) If Dick can get a QSL from Ernie, it might be the beginning of a beautiful UHF schedule and perhaps a beautiful Sheraton hostelry in York Haven! Ernie is constantly in the forefront of those who make good headline news.

The Sheraton Corporation has been celebrating its silver anniversary as one of the world's largest hotel, motel and office building chains. Its growth ranks high among successful American business legends and its outstanding success is the handiwork of Ernie and **Robert Moore.**

The collection of news for these columns has become a co-operative activity of your Secretary's family. Daughter Ellie takes time from her hospital duties in Grand Rapids to write: "I have just received my copy of the 'Atlantic Monthly' and found the article by John T. Rule to be quite interesting. It is entitled 'Must Colleges Police Sex?' and starts on Page 55 of the April issue. Quite a subject for an M.I.T. man to report." . . . Our son, who is associated with Chase Manhattan in New York, has presented us with a bound volume of reprints of the cover of "Business Management" for March, 1964, and 10 pages of an article and comment on **Saul M. Silverstein** and his pioneering in "crisis-free bargaining" at Rogers Corporation, which has resulted in 26 years of continuous plant operation without a strike. The keynote of the article is the first paragraph, which says: "The heyday of the big talk has come." Saul is quoted on his institution of a labor-management committee when he became Rogers' president, its growth to four committees to handle as many union locals and his comments on the use of such methods by others. An interesting sidelight is the editor's own story about the legend lettered on the door of a room adjoining Saul's office. "Room for Understanding" indicates not only its use as a meeting ground for management and labor but also emphasizes that inside there is always room for understanding. Incidentally, we received a Rogers Corporation one-dollar "Duro Certificate," inscribed "This certificate is not legal," the use of which is not clearly stated. No doubt with 15 cents it will buy a subway ride, despite the company's good annual report!

Retirement, someone has told us, is defined as twice as much husband and half as much income. Be that as it may, the Industrial News section of the "New England Purchaser" tells of the retirement of **Francis B. Kittredge,** for a quarter century the Boston District sales manager for Jones and Laughlin Steel Corporation. Frank joined the company in 1928 as a salesman in Philadelphia. Ten years later he was assigned to Boston and promoted to the managerial post. . . . Another recent retiree is **Edward W. Booth.** Scripps has left Natick, Mass., for a new home at 261 N. E. 2nd Street, Boca Raton, Fla. . . . Dr. **Russell B. Tewksbury** has a new business address in care of the Veterans Administration, Central Office 151E, Vermont Avenue at Eye Street, Washington, D.C., 20420. . . . **Douglas Weatherston,** geologist, who maintains his offices in San Antonio, Texas, has a new home there at 435 Sheraton Drive. . . . **Paul H. Rutherford,** General Manager of the Delco Appliance Division of General Motors, has almost 40 years of service in the automotive field with Delco. . . . **James L. Entwhistle's** firm, Entwistle Manufacturing Company of Cranston, R. I., is in the news as the recipient of an important defense contract for training weapons for aircraft. We hear Jim has a home in Maine and has narrowed active business participation. . . . **John W. Barriger,** President of the Pittsburgh and Lake Erie Railroad Company, has announced its prospective merger with the Pittsburgh, McKeesport and Youghiogheny Railroad Company, which has been operated by the P. and L. E. since 1884 under lease.

Professor Emeritus **Victor O. Homerberg,** now a resident of Santa Barbara, Calif., has an interesting comment on the inception of stainless steel razor blades, which appeared in a feature article in the "Prince George Citizen" of Prince George, B. C., Canada. The article discusses the feasibility of mass producing the blades and the competitive progress made in the industry. It concludes with: "And Victor Homerberg, a retired metallurgy professor from M.I.T., recalls that a Brooklyn firm introduced a blade in the early 1940's that gave comfortable shaves for more than a year. He ran tests on the new blade, which was made of nitrided steel, and doubts that it could have been mass produced in uniform quality." . . . **Arnold R. Davis** is the author of an article on "Delayed Action Accelerators in Polybutadiene/SBR Blends," which appeared in "Rubber World" magazine. Arnold has been technical service manager of the rubber chemicals department of American Cyanamid Company, Bound Brook, N.J., since 1960, after holding posts as head of the rubber chemicals laboratory and manager of rubber chemicals research. During his 40 years of work in this field, he has written many articles on compounding. Holder of some 30 patents on rubber chemicals, he is considered to be one of the top contributors to publications in the rubber field.

Unique in the annals of the Educational Council of M.I.T. was the day-long symposium on modern science and engineering, sponsored in mid-April jointly with the M.I.T. Club of Northern New Jersey and representing the contribution of New Jersey alumni to the state's Tercentenary Year program. High school guidance counselors, alumni and their wives attended morning, afternoon and evening sessions and were hosted at luncheon, dinner and a reception by a committee which included **Joseph Wenick,** Chairman of the symposium; **Sumner Hayward,** who handled registration; and **Cac Clarke,** publicity. The fourth member of the class in attendance was **George Chutter.** Technology provided outstanding speakers from the faculty and staff, including Dean Howard Johnson of the Sloan School of Industrial Management. It was particularly good to welcome Sumner Hayward back to active participation in club affairs after his experiences with major surgery twice in one week somewhat earlier this year. . . . **John J. Winn, Jr.,** has been engaged by the Port of St. Helens, Ore., in a consulting capacity to assist the port commission in its expansion plans. Jack, who retired as general manager of the Port of Portland after 12 years of service marked by notable advances in the facilities and operation of the port, is a past director and current honorary member of the American Association of Port Authorities. A native of Haverhill, Mass., he started his career as a cadet engineer with Stone and Webster. He became development engineer of Consolidated Electric Light and Power Company of Baltimore, commercial engineer of the Portland Gas and Coke Company and then general manager of the Honolulu Gas Company in Hawaii. He is a former member of the Oregon State Board of Education.

It is a most heartwarming experience to answer the telephone and have a familiar voice say: "This is **Ed Farrand.** How are you?" Reporting from his home at Kinchafoonee Lodge, Leesburg, Ga., Ed says he and Helen are enjoying good health and are looking forward to their trip to Cambridge for Alumni Day. Ed sent his good wishes to Sumner Hayward for a speedy recovery. He was host to **Don** and Millie **McGuire,** who stopped off in Leesburg for a few days during a tour of the southeast, visiting friends and relatives. Ed also told of a seven-week Mediterranean cruise which the **Larc Randalls** took earlier this year. Ed made a strong plea for '21ers to visit him in Leesburg. He says it is on the direct motor route to Florida and retirees or vacationers have no excuse for not contacting him. Thanks a million, Ed and Helen. . . . As it so often seems to happen, Class News comes in related pairs. A welcome letter arrived from Donald B. McGuire, who gives his address as Bayberry Knoll, Freeman Lane, Box 126, East Brewster, Mass. Don writes: "Ever since, and even before, I received the December copy of The Review, I had intended to advise you of my changed status, to wit, going from labor to refreshment. I did retire from business in February of last year and took up permanent abode in July in our new home here in East Brewster, which you alluded to in the Class News. The following article, which appeared in the company's house organ at the time of my retirement from Orange and Rockland Utilities, Inc., tells of my activities: 'Donald B. McGuire, Chief Engineer, retired February 1, 1963, terminating a long and distinguished engineering career in the electric utility and consulting fields. He was born in New Berlin, N. Y., attended Rensselaer Polytechnic Institute and was graduated from M.I.T. in electrical engineering. He was then employed by Charles H. Tenney and Company of Boston. His duties took him to Rockland Light and Power Company territory as a consultant and field engineer. In 1935, he became a construction engineer with the Rockland company. In 1936, he became production superintendent and, in 1943, was named chief engineer. He is a licensed professional engineer in New York and New Jersey, a member of the Institute of Electrical and Electronic Engineers, the National Society of Professional Engineers and the New York State Professional Engineers. He has two children and six grandchildren. His daughter, Janice, lives in Suffield, Conn., and is married to Paul R. Rothery, Jr., M.I.T. '51. Don, Jr., lives in Huntington, N.Y. He and his wife, Nancy, are both graduates of Middlebury College. Color pho-

tography and woodworking predominate as the hobbies of Don, Sr. As a maker of fine cherry furniture, he is known among home craftsmen as 'Mr. Hepplewhite.' He is a former president of the Middletown, N.Y., Color Slide Club. Don and Millie have built a retirement home on Cape Cod.'

"I stopped off at the Institute last fall and had a chat with our old friend, Professor Carlton E. Tucker, '18, of the Electrical Engineering Department. My primary objective was to ascertain if there was still in the archives of the old Student Branch of the A.I.E.E. a letter which I had received from Thomas A. Edison back in 1921, when I was chairman. It seems I had the temerity to write to Mr. Edison, inviting him to be guest speaker at one of our meetings. One of the department secretaries was most helpful and after a careful search, I found at the bottom of a dusty drawer the correspondence file I was seeking. Although finding the carbon copy of my letter to Mr. Edison, alas, some more astute and perspicacious individual than I had extracted Mr. Edison's reply, which today might be considered almost priceless. It is my fond hope that the person in possession of the letter will be good enough to send me, anonymously, a photocopy of the reply. It was directed to me personally, as I recall, and therefore had a special and sentimental value. I was sorry to learn of your accident and trust that by now you are fully recovered from the effects. Should you ever come to the Cape, be sure to look us up. I, for one, want to express my gratitude for the terrific job and contribution which you have so unselfishly done for the members of our class and others in unfailingly submitting news for publication in The Review. Thanks very much." It's a pleasure, Don, to be of service, and we hope you will be at Alumni Day so we can express our appreciation in person. Meanwhile, anyone knowing the whereabouts of Mr. Edison's letter is earnestly requested to write to Don.

Munroe C. Hawes sent us a post card he received from **George** and Eddie **Gokey,** postmarked in Tahiti. The Gokey couple were on another South Pacific cruise, heading for Australia and, as George put it, thankful to escape shoveling snow back home. Munnie and Alex took off on a trip through Belgium, Luxembourg, and the Netherlands, to be covered by motor car. They will go to England and Scotland just before returning in time for Alumni Day. Munnie asked for the Madrid telephone number of **Helier** and Graciela **Rodríguez,** so he could bring back some up to date news of our good friends. . . . Here, again, was the strange occurrence which so often happens. Right after the Hawes' departure, we received a grand long letter from Helier and Graciela which reads, in part: "We were delighted to receive your December letter and very glad to learn how fortunate you were in coming out without serious injuries from that unfortunate automobile accident. Our life has drifted along in good health, still in a waiting, purposeless attitude. At our age, when the course of our lives is so violently shaken up, it is not easy to find a satisfactory bearing for our spirit. We remain in contact with friends and relatives in and out of Cuba and try to help them as much as we can. There are some really very sad cases of families broken up, spread out in different parts of the world and with financial difficulties. Many are striving to get out of Cuba, but not all of them succeed. This country seems to be the only door yet open. There are one or two flights a week and about 500 Cubans arriving monthly, without money and without sufficient clothes. Graciela goes regularly once a week to help distribute clothes to those who have just arrived. Those who are still in Cuba do not have sufficient food. We are taking advantage of the air situation to send them 13-pound packages of concentrated food on the return flights, since they do not have passengers and can apply the plane capacity for freight. The rates are high. Perhaps you do not know that those who are allowed to leave Cuba are fully searched. They are undressed at the airport, usually the heels of their shoes are taken off to be sure they are not hiding jewelry, and then badly nailed back in place. They cannot take money and are allowed very little clothing. The humiliation is worse than anything else. Last January, we had a nice, but very brief, visit at the airport here, with our classmate, **Ralph M. Shaw** and his wife, Madeline. Their plane from Rome to New York stopped here for an hour. They were returning from a Christmas vacation with their daughter in Germany and a trip which all of them had made to Egypt. Last year, I also had a brief visit at the airport with **Oliver Bardes.** He wrote me at Christmas that he might come again this spring. Our best wishes to you both." Graciela added her good wishes and expressed the hope we would come to visit them. We are most grateful for the many kindnesses and courtesies which this wonderful couple has extended to us and to the entire Class of 1921. On behalf of everyone, we send them kindest regards and sincere good wishes.

We have had several phone calls from our Class President, **Ray St. Laurent,** who reports that he and Helen will be in Nova Scotia just after a visit to the New York World's Fair. They will return to attend Alumni Day. Ray advised that Sumner Hayward had been included in our 45th Reunion Committee in view of his active interest. You have now received another 1921 Class Letter which advises that decision was made not to hold an interim reunion in 1964. Response for a 1965 gathering was also small and the committee has agreed to continue consideration. Your further recommendations are welcome. The Mountain View House was only a preliminary choice for our 45th Reunion in 1966 and will not be the site of the festivities. Announcement of the spot chosen is expected shortly. . . . Theme for Alumni Day on June 15 is "The Medical Sciences at M.I.T." You will be amazed at, and vitally interested in, the bigger new Technology as well as what Professor George R. Harrison, Dean of Science, Emeritus, and his panel of noted scientists will describe and demonstrate to us. Above all, come back and treat your classmates to a visit with you and your wife. Have a good day's relaxation on campus in Cambridge. See you there!—**Carole A. Clarke,** Secretary, c/o ITT Data and Information Systems Division, Route 17 and Garden State Parkway, Paramus, N.J. 07652; **Edwin T. Steffian,** Assistant Secretary, c/o Edwin T. Steffian and Associates, 376 Boylston Street, Boston, Mass. 02116.

'22

Sunny old Buffalo is living up to its reputation for good weather but Lake Erie at our doorstep is still full of ice. Your secretary's trade mission to South America was active, arduous and ambitious making it necessary for a three-week restful recovery which was taken on the way back in Florida in three days. . . . The March 6 Time reports that **Eric Hodgins** has "emerged, more or less intact" to write "Episode—Report on the Accident Inside My Skull" which they describe as a wry, spry, keenly observed story of a stroke and how it has affected his life for the past four years, starting January 8, 1960. They tell that it took three ball point pens to write "Episode" but "the fact that it was written, that it reflects so much of his old time waspish wit and wordcraft, is the most substantial evidence of Eric Hodgins' recovery." Greetings to Eric at 150 E. 50th Street, New York 10022. Best wishes from us all. . . . We are delighted to have **Donald Carpenter** as the new Alumni president. Don has always been active in the affairs of the Institute and will continue to be a great force for it's welfare.

We are sorry to hear through **Horace McCurdy** of the death of **Barrett G. Hindes** on March 21. Our deepest sympathy goes to Peggy and his four sons. Barrett was called the Dean of Western Dredging Engineers and was a builder of harbors from Midway to Okinawa in World War II. He was affiliated with the San Francisco Bridge Company, serving as president from 1946 to 1957. He was a director of Wells-Fargo Bank and the Argonaut Insurance Company; a member of the board of directors of the California Academy of Sciences. Among his hobbies was stamp collecting, an avocation which earned him a gold and silver award at the International Philatelic Exhibition in London in 1960 and three awards of the New York Collectors Club in 1961. He bequeathed his collection to M.I.T.

Your assistant secretary **Oscar Horovitz** has been opening his second bushel of mail after returning from Florida's sunshine of the winter. He enclosed the following letter from **William W. K. Freeman** of Salem: "On January 6, I began teaching sixth grade arithmetic and seventh grade Latin at The Pike School in Andover, Mass., on the Monday following my retirement as statistician of Mutual Boiler and Machinery Insurance Company where I started as sales engineer 26 years ago. I decided four years ago to resume the teaching of mathematics, in which I

had tutored boys at Roxbury Tutoring School while still an undergraduate at Yale. I found there had been a revolution in mathematics in the intervening years, and for two years spent almost all of my spare time studying. Certain that an emergency vacancy would occur this January, but not knowing where, I presented my credentials in person at 201 private schools and junior colleges in New England so they would see that I was not yet equipped with ear trumpet and cane. Luck was with me in bringing an opportunity within commuting distance of Salem. The first marking period is just over, and I am satisfied that this third career is the life for me for the next 10 or 20 years. Nothing has been so exciting since freshman year at Yale, when the world opened before me, and I am having a perfectly wonderful time always searching for new ways to make patterns in mathematics clear and to bring to life the days of ancient Rome." Good luck to you, Bill, in your new career! . . . Yours 'til Alumni Day, for better golfing in '64, and the 1967 Reunion at the Wianno Club.—**Whitworth Ferguson,** Secretary, 333 Ellicott Street, Buffalo, N.Y. 14203; **Oscar Horovitz,** Assistant Secretary, 33 Island Street, Boston 19, Mass.

'23

An article by **Charles F. Smith** in the Rotarian magazine for December will be of interest to his classmates: "Responsiveness, a Quality to Cultivate." "Kindness should be done on an impulse." Charles retired recently after 34 years in the public relations department of the New York Telephone Company. . . . The Tennessean for December 25, reported the death of Brigadier General **H. A. Nisley** of 317 Lynwood Boulevard, Nashville, a prominent Nashville businessman and highly decorated officer. Full military honors were extended at the funeral in Arlington National Cemetery. He had been chairman of the board of Warren Paint and Color Company since 1948, when he retired from the Army. Between the wars he served in ordnance offices in Boston, Alaska, Maryland, Kentucky and was professor of military science at M.I.T. He was ordnance general on the staff of General Omar N. Bradley, Commander of the 12th Army Group during World War II. General Nisley received the Distinguished Service Medal, the Legion of Merit, and the Bronze Star from the United States. Great Britain made him a Commander in the Order of the British Empire, and he received the Legion of Honor and the Croix de Guerre with Palm from France, the Order of Leopold II from Belgium, and the order of Orange-Nassau from the Netherlands. . . . An article in the Investment Dealers' Digest of February 10, 1964, "Research Plays Major Role at Sprague Electric," interestingly points out how **Robert C. Sprague** invented a radio tone control while still a lieutenant in the Navy. He resigned from the Navy in 1928 to devote his time to the business bearing his name, which was then three years old. Sprague Electric then went on to become the largest producer of capacitors in the United States. The company has initiated an extensive development program in the field of microelectronics. . . . **William Webster,** Chairman and chief executive officer of New England Electric and President of Yankee Atomic Electric, has been awarded the New England Award of the Engineering Societies of New England. The award is presented during Engineering Week each year to a living engineer, resident in New England, who merits recognition of his work as well as of his character. The award was presented to Webster at a luncheon meeting at the Sheraton Plaza in Boston. William, who is considered one of the leading authorities in the nation on the peacetime uses of the atom, was cited for his dynamic utility management and his leadership in the award-winning Yankee Atomic Electric Company. The Yankee project at Rowe, Mass., was previously cited as an outstanding atomic achievement by the Atomic Energy Commission. In June last year William accepted the Edison Medal, top award of the electric utility industry, on behalf of the company. He is a graduate of the United States Naval Academy and holds additional degrees from M.I.T. He has also received honorary degrees from Bates, Tufts and Lowell Technological Institute. He is a member of the corporation of M.I.T., chairman of the Advisory Council of the Woodrow Wilson School at Princeton, N.J., a trustee of the Rand and Mitre Corporations, a director and vice-chairman of the Federal Reserve Bank of Boston.

S. C. Dearstyne, chief engineer at the Port of Seattle, announced his resignation as of January 31. During his more than 18 years of service with the port, the last three of them as chief engineer, he has supervised the design and construction of many of the ports' most ambitious projects, both on the waterfront and at Seattle-Tacoma International Airport. During the war he worked as a structural engineer with the Everett-Pacific Shipbuilding and Dry Dock Company in Everett. He has played an important role since 1945 in developing Sea-Tac into one of the nation's finest airports, representing a Port of Seattle and federal government investment of more than $25 million. An even greater responsibility has been the launching of a $35-million harbor development, begun in 1960 when he became chief engineer. He is recognized as an authority on small boat marinas, stemming from his close connection with the design and construction of the Shilshole Bay Marina, and has written numerous articles and technical papers on his work. . . . The San Antonio Express News on February 9, reported the marriage of Mary Austin Rutherford to Walter Klingman. Miss Rutherford's parents are Mr. and Mrs. **John Ward Beretta.** . . . **Egon E. Kattwinkel,** M.D., of 65 Sterling Street, West Newton, died on March 15 at Newton-Wellesley Hospital. He was a graduate of M.I.T. in 1923 and Harvard Medical School in 1930. He began as an intern at Newton-Wellesley Hospital and later started a private practice of internal medicine. He retained his association with Newton-Wellesley Hospital throughout his life, serving as chief of cardiology. He was a past chief of medicine at the hospital and past-president of Boston Chapter, Massachusetts Heart Association. He was a member of the AMA, Massachusetts Medical Association, Charles River District Medical Society and Roxbury Society for Medical Improvements. Also, he was past president of the Newton Medical Club and a member of the Alumni Council of M.I.T. and of the Tuesday Club. He leaves his wife, Mrs. Dorothy (Fish); two sons, Dr. Norman, of the Navy and John Kattwinkel, of Troy, N.Y.; a daughter, Mrs. Stephen Wilson of San Jose, Calif., and a sister, Mrs. B. Alden Thresher of Waban. Memorial services were held at the Second Church, West Newton. Those of us who knew and worked with Egon are saddened by his sudden passing.

The following changes in address have been reported: **Charles R. Bailey,** 809 Rockview Court, Duluth, Minn. 55804; **O. William Lowry,** Sligh-Lowry Furniture Company, Holland, Mich.; **Finn Kuhnle,** Storetvedfoeien, Fana, Norway; **Robert J. Hull,** R.F.D. 1, Box 126, Colrain, Mass.; **Felipe Diaz-Ossa,** P.O. Box 84D, Santiago, Chile.—**Forrest F. Lange,** Secretary, 1196 Woodbury Avenue, Portsmouth, N.H. 03801; **Bertrand A. McKittrick,** Assistant Secretary, 78 Fletcher Street, Lowell, Mass. 01852.

'24

As this is being written your secretary is sitting across the desk from your class president who is engaged in a 'round-the-country telephone campaign. Our 40-Year Gift, the biggest of our alumni career, is to be announced at Alumni Day on June 15, and by mid-April it still left something to be desired. As you may remember from **George Knight**'s recent letter, we now may count in all pledges to be paid before June 30, 1966. But these have to be known before Alumni Day of this year. That's why the telephoning; and if you weren't called and haven't yet made your pledge, please do so now. Time is running out! . . . Between calls **Paul** reported on the April class luncheon at which there were 10 present. They were Walter Bagby, Tom Bundy, Ray Forsyth, Ham Lindstrom, Bill MacCallum, Paul Miller, Howard Stevens, Henry Tanck, and Gavin Watson. Several regulars were unable to be there, but Tom Bundy, an occasional, and Messrs. Lindstrom and Watson, newcomers, helped fill the ranks. . . . **Ray Lehrer**'s last African letter came from Cairo. He detailed some of their adventures with countless wild animals, told of the poverty and the flies in Addis Ababa, and of the trips to Luxor and the Aswan Dam, where 35,000 men (including 2,000 Russian technicians) are working two 12-hour shifts. The African tour ended, the Lehrers headed for the continent. They will be home for Alumni Day.

Donald O. Kennedy, the peripatetic miner, has come back east. He's been in Denver in recent years, but now is in Knoxville, Tenn. Presumably he is still a government agent. . . . **Walter R. Weeks** is an engineer in G.E.'s Light Military Electronics Department, Microelectronics Subsection. He is also an inventor with 35 patents to his credit so far. They vary widely. There is one for a self-cleaning oven, for example; another for a hydraulic thermostat bulb shielding device; and still another for a high-temperature shut-off switch. Then there are molded rubber goods, portable and major electrical appliances, and military equipment. Walter is a man of many interests. . . . The Phelps Dodge Corporation has announced the formation of a new subsidiary to manufacture aluminum products "closely allied to its present line of copper products." **Edgar P. Dunlaevy,** President of W. D. Copper Products Corporation, will serve as president and chief executive officer of the new P. D. Aluminum Products Corporation as well.

"For a doctor's son who once drove a sightseeing bus around Boston 40-odd years ago, **Ed Hanley** has sure moved out! And his success has made him a better spokesman than most for private enterprise." That's the lead paragraph in the lead story in a recent Harvard Business School Bulletin. It is a well done story about Ed, who is as valued an alumnus of H.B.S. as he is of M.I.T. What brought back almost forgotten memories of long ago to your secretary was that bit about "drove a sightseeing bus." How many others remember when the Royal Blue Line came to the T.C.A. looking for both drivers and barkers? Some of us lasted through the whole summer and a couple even did it again the next year. Some of the corny cracks even come back: "On the right is the Bullethole House. The glass is over the bullethole to prevent the tourists from stealing it." And one of our classmates was short on memory but long on imagination. His listeners ended their rides with very garbled if authentic sounding glmpses into our past history. **Carl Johnson,** one of Ed's fellow drivers, went canoeing below Concord Bridge while his passengers took in the sights, and was drowned.

A fascinating and unique story from the Chicago Tribune details the door troubles of Mrs. Kochs, English wife of Chicago industrialist **Herbert W. Kochs.** Seems they have a home in fashionable South Kensington, and the old door was warped and drafty. So Mrs. Kochs had a modern front door installed. But a Mr. Anstruther, who owns two-thirds of the other houses in Thurloe Square, claimed it was out of character with the Victorian appearance of the square and took it to court. He won. Cost of a suitable replacement: $160. Cost of the 3-year court battle: $4,200. Said Herb: "My wife is going to be pretty sore about this." . . . To **John Fancher** of Chatham, N.J., goes the sympathy of the class in the death of his wife after a long illness. . . . These are the last notes before our 40th Reunion. We won't be able to tell you what went on and what a good time was had by all until next fall. So the best way is to come and see for yourself. See you there, I hope.—**Henry B. Kane,** Secretary, Room 1-272, M.I.T., Cambridge, Mass. 02139.

'25

The 40th Reunion Gift Committee: Sam Spiker, Mac Levine, Fred Greer and your secretary met with Don Severance, '38, and Ken Brock, '48, of the Alumni Association on March 26, 1964, and made plans for moving rapidly on the Gift Program. Many of you should have received letters from Sam and Mac asking you to serve on our 40th Reunion Committee; and since this report appears in print six weeks after it is compiled, it is hoped by now all of you have accepted the invitations. There is a big job to be done, and every member of the Class of '25 will need to do his share. You will be hearing a great deal more about our goals and plans over the coming months, both from members of the class and through correspondence. . . . The Boston Herald on April 1, 1964, made note of the fact that **Ralph F. Gow** has been elected a director of the Dennison Manufacturing Company. . . . A note from **Bill Asbury's** secretary indicates that Bill has been hospitalized but is now home recuperating and expects to be back to work shortly after the middle of April. . . . Announcements have reached this office of the deaths of three members of the class with no details. **Twitty Whaley** passed away in Chicago on February 2, 1964. . . . **Onslow S. Robinson** died in West Tisbury, Mass., on March 3, 1964; and **Thomas W. Tuttle** died in Brooklyn, New York on March 16, 1964.—**F. L. Foster,** Secretary, Room 5-105, M.I.T., Cambridge 39, Mass.

'26

At five A.M. the sun was streaming in my bedroom at Pigeon Cove, and I have never learned to sleep in the day time. However if we build another house, as we hope some day, the bedroom will not be on the ocean side and it will not have a picture window. I have always had an idea, that I thought was original, until I recalled that Kayo in the Moon Mullins comic strip always sleeps in a drawer. My idea is to have a large drawer about the size of a coffin and comfortably lined. To go to bed you would get in, press a button and it would slide into an air conditioned wall, nice and dark. A hotel the size of the Americana could be built in a basement. After all when asleep what difference does it make? How did I get off the track on such a nice, sunny morning—especially since no one has ever showed a bit of interest in my idea. But you wait, 200 years from now when some archaeologist is reading our Class News and the population explosion has reached its peak! . . . I have been rambling this morning because I knew my work was done for me. **Mark Greer** wrote recently from his home on Shipyard Road in Middle Haddam, Conn.: "Dear George, Your March, 1964, '26 Class News was most enjoyable. And, page 51 listing locations of Class Reunions should suggest excellent places for our 1966 Reunion. Do you suppose our reunion will include our wives? **Bill Forrester** and Mrs. Forrester entertained Mrs. Greer and me one evening in Honolulu in February. Bill is fine. They are old time visitors to Honolulu. Bill is very interested in **Austin Kelly**'s project and has lined me up. Last week in New Haven, Conn., I was happy to find **Eb Haskell** available at lunch time. We enjoyed talking over old times. Eb is still busy at United Illuminating Company. I get to Arlington, Mass., now and then. Our daughter's husband is enrolled in the Harvard Business School at age 35. He's a brave man. A little work, some time devoted to Boy Scouting, a little time fishing and hunting and now golf again keep me occupied. Can you get me **Emerson Wicks Eddy**'s address? I receive his Christmas cards from Vermont but there is no detailed address and my letter never reached him. He retired to Vermont. I hope to attend the 'E.A.R.C. rowing or crew races listed on page 51 of the Review for March at Worcester, Mass., on May 16. In the past several years at these races I've never met an old M.I.T. grad. Maybe we could establish a meeting place. Best wishes. Sincerely, Mark Greer."

Then a few days later your pleading class secretary received another windfall, a letter from **Bill Sessions:** "Dear George: The M.I.T. Association of Cleveland sponsored a symposium in Cleveland recently and **Jim Killian** was the dinner speaker. At the same time we had a regional Class of 1926 reunion. **Red Elmendorf, Frank Schreiner** and I were present from the Cleveland area. **Al French** flew his own plane up from Piqua. **Charlie Milem,** from Sidney, Ohio, was here, and **Bob Williamson** came over from Erie, so that with Jim seven of us were on hand. Red Elmendorf is still with G.E. at Nela Park and has recently built a new house on a large piece of ground in an eastern Cleveland suburb. Frank Schreiner has retired and lives in Aurora, Ohio, when he isn't traveling. Al French runs the French Oil Mill Machinery Company in Piqua, Charlie Milem says he is a farmer, and Bob Williamson is with G.E. in Erie. I continue in the practice of patent law in Cleveland. Considering the fact that our 40th reunion is only two years away, I thought we all looked pretty good. The morning after the symposium, Marian and I started to drive to the West Coast. We spent a week at Tubac, Ariz., 30 miles south of Tucson, and then went on to Rancho Sante Fe, Calif., sold the car in San Diego, and flew home in time for another snow storm. The Tucson area and Rancho Sante Fe are both very nice, and we saw quite a few retired people who seemed to be enjoying themselves. Right now, though, I hope that retirement does not happen to me for at least a few more years; I have yet to see a place where I would like to live all year around. In January I had a hurry-up business trip to London and was lucky enough to have dinner with **Dave** and Kay **Shepard** at their attractive apart-

ment, only a few minutes walk from Grosvenor House where I was staying. This was on January 29, and we quietly celebrated Dave's 61st birthday. Dave and Kay both seemed fine. Much of the conversation was devoted to the Class of 1926 and the plans of Austin Kelly's committee —that is when we could be diverted from the subject of trout fishing. With all good wishes, Sincerely, Bill Sessions." These contributions should inspire more letters from classmates during the summer so that come fall we will have a nice little backlog. While you think of it take out that reminder list and add to it that you are going to write **George Smith**—a "penny" postcard will do if enough of you remember. . . . Classmate **H. C. Pete Ruggles** recently wrote **Pink Salmon** and asked if anyone could supply a numbered list of our classmates in the picture taken of our 25th at the Griswold. If anyone has such a list please send a copy to Pete whose address is 75 Prospect Street, Amityville, L.I., N.Y. 11701. When incorporating letters in the notes I cannot gauge how much space has been consumed but I can guess, so my guess is to turn it off, so until July, Cheerio.—**George W. Smith,** Secretary, E. I. DuPont de Nemours & Company, 140 Federal Street, Boston, Mass.

'27

Frank Marcucella, President of the John A. Volpe Construction Company, is hard at work on three new construction projects: a veterans' hospital in Gainesville, Fla., another hospital in Washington, D.C., and a theater on the campus of Brandeis University. We hope that Frank put in a lot of time on the Florida project this spring. . . . In the February notes, we reported **Paul Vaughan**'s address to the A.S.M.E. annual meeting on "Factors Influencing Bearing Performance in High-output Diesel Engines." For the excellence of the presentation, he has now been awarded the Speaker's Award of the A.S.M.E. Oil and Gas Power Division. Simultaneously, Paul has been named a fellow of A.S.M.E. . . . **Clarence Wynd** has been elected a trustee of the University of Rochester. He had formerly served as chairman of the advisory committee for the University's department of chemical engineering. . . . **Dick Cutts'** move from Schenectady to New York involved his assignment to the position of manager, special customer meetings, of General Electric Company. Dick reports that he and wife are enjoying living right in the heart of the big city and looks like he will be spending a lot of time at the World's Fair. . . . **Eugene Herzog,** who heads up his own electrical engineering consulting firm, has moved from Park Forest, Ill., to 26 Cliff Street, Dayton, Ohio. Most of his past work has centered in Dayton. . . . **Darcy A. Young, Jr.** has moved from Rochester, N.Y., to P.O. Box 98, Peterboro, N.H. . . . **Albert F. Schaad's** new address in Croton-on-Hudson, N.Y., is 13 Lexington Drive.—**Joseph S. Harris,** Secretary, Masons Island, Mystic, Conn. 06355.

'28

On Friday, April 3, we had a pleasant one-martini luncheon in Concord, Mass., with **Jim Donovan,** your Class Treasurer, and **Charlie Worthen,** your Class Agent. **Ralph Jope,** our President, was to attend but was called into an important committee meeting at The Review offices at the last moment. We talked briefly of class matters and soon indulged ourselves in some of our work problems and business plans. Ralph and Jim are about to bring out a new product that requires a fairly substantial investment; and Charlie, these past many years promotion manager for General Radio Company, offered a few suggestions on early promotion methods for this new project. It wasn't long before we all described thoughts on retirement. Jim said he would probably never retire, and Charlie said he certainly hoped to retire and travel over some of the highways and byways of the world. Charlie reported some fairly good gifts to the Alumni Fund by a few of our classmates, and these have encouraged him in his work. He hopes that these gifts are persuasive examples to others who have been delinquent. . . . We note in a news release that crossed our desk recently that **Benny Hough** was to be principal after-dinner speaker at a meeting of the American Society of Civil Engineers on April 29 at the University of Vermont. They introduced Benny in the news release as a former professor of civil engineering at Cornell University, author of "Basic Soils Engineering," and a member of the consulting firm of B. K. Hough.

A recent letter from **George Bernat,** 320 Morningside Drive, Sarasota, Fla., congratulated us on a "newsy" column that he enjoyed reading. The realization that we had at least one fan upset us for the remainder of the day. He continued: "We have given up the apartment in New York City which you mentioned in a recent issue and now plan to spend most of our time here in Sarasota. Ruth could not take the smog in N.Y.C., and I did not enjoy living away most of the time, so I resigned from the work I was doing with the Century Sportswear Company. We do hope to take occasional trips to various parts of the globe and break up the monotony of retirement in this manner." He requested Bill Hurst's address, which we have already forwarded to him; and we herewith transmit his regards to Abe Woolf, Jim Donovan, Ralph Jope and all other classmates in the Boston area.

We assume that it is always embarrassing to a man to publish the story of his life, no matter how brief that story might be, while he is alive and still in the best of health, particularly if that story follows a pattern of Horatio Alger. We mentioned in our notes last month that the Houston Chronicle of February 23 published the story, under the byline of Jim Clark, that was a biographical sketch of **Bill Hurst.** As we all know, Bill is a very modest fellow, and the most we could get out of him at the reunion personal report was: "I'm engaged in petroleum reservoir engineering. My family life is happy. I work like hell. My recreation is sailing." We publish the following with apologies to Bill, because this story is typical of a very large group of our classmates. "One way to get rich is to accumulate more cash than you need to meet all of your requirements. Another way is to make almost enough to meet those requirements while you are exercising your mind to your heart's content. William Hurst chose the latter. So, last Wednesday night at the fancy new Americana Hotel in New York he marched up to the podium and received the Anthony F. Lucas Medal for Achievement, the annual award made by the American Institute of Mining Engineers. The heartwarming story of Bill Hurst should inspire young people to enter the field of science and technology and strive to be the best.

"Born in 1905 to a poor immigrant Boston family from Estonia, Bill Hurst rose through the ranks the hard way, and when he received the Lucas Medal he joined company with petroleum industrial immortals. Hurst now lives in Houston and occupies two small offices in the Bank of the Southwest Building. As a boy he chose vocational training (hoping to become a machinist and instrument maker) in Boston's Quincy Grammar School. He continued at Mechanics Art High School, and became imbued with the idea of going to Massachusetts Institute of Technology, an almost impossible dream for a poor boy. But when he finished high school 'magna cum laude' he found himself in possession of a scholarship to M.I.T. and the world opened for his natural genius. Last week Bill Hurst recalled the night he graduated from high school. He had worked hard all that day and was late for the ceremonies. The principal upbraided him, and he almost walked out until he was grabbed and told he was to receive the highest honors and the M.I.T. scholarship. At M.I.T. the first day he was fascinated with a Professor Passano who demonstrated mathematically how the draft entering a classroom window could affect the rate at which the window could be closed. This simple demonstration led him to major in calculus and mathematics. He was constantly inspired by the dedicated teachers at M.I.T. and he learned well, taking a master's degree in 1929.

"At Bethlehem Steel in Buffalo, his first job, he observed heat effects from blast furnaces, open hearths and soaking pits and later was able to apply heat transmission as the diffusivity equation to the water drive that existed in the Woodbine formation of the great East Texas oil field. From these observations, and the pioneering application of mathematics to reservoir mechanics, Hurst contributed vastly important science and technology to reservoir control in both oil and gas production. A few years ago the Arabian American Oil Company asked him to perform certain water drive calculations for the Safaniya field in Saudi Arabia in an extremely short period of time. He made the computation in days, a job that ordinarily would require weeks or months. By this act he had developed the simplified material balance calculations by the application of the Laplace transformations, and in so doing

plowed a new field in petroleum science. Recently he carried out similar studies in simplified material balance equations to apply to gas storage aquifers in the Chicago area. William Hurst thinks reservoir engineering is still important. But he believes well completion is even more important in today's deep drilling. 'What we need now are diggers who know how to bring in a well.' he said."—**Hermon S. Swartz,** Secretary, 27 Muzzey Street, Lexington, Mass.

'30

As reported elsewhere in this issue, the annual dinner of the New York Alumni Center drew a sizable audience to hear Dr. Killian and Congressman Miller speak on "Science and Public Policy." Our class attendance record was rather better than usual. Since **Henry Pattison** presided, he and Mrs. Pattison were seated on the dais. At the '29-'30 table we had Jane and **Bob Armstrong,** Chesley, '31, and **Morris Young** and **"Tull" Houston.** As previously noted in this space, Bob is vice-president of Celanese Corporation and Morris is an ophthalmologist. The Young's daughter, Sherry, is planning to go into medicine and thinking about a premedical course at M.I.T. Tull is still carrying on his industrial real estate business in Newark. He has a son at Dartmouth and two daughters 16 and 10. . . . **Ted Ross (Irvine E.)** is manager of Induction Motor Engineering for General Electric in Fort Wayne, Ind., and is concerned with the design and manufacture of sub-fractional induction and shaded pole motors. The Rosses have two sons, David and Philip, who graduated from Michigan State and Indiana respectively. Daughter Kathy, who accompanied her parents to the 30th Reunion, is now at Indiana. Ted is active in church work as treasurer, choir director and member of the building committee. He is a fellow of A.I.E.E. and received the Fort Wayne "citizen-engineer" award in 1958. He reports having recently seen **Irving Dow,** who retired from the Navy Department in 1961. . . . **Stan Russell** is president and treasurer of Johnston-Foster Company, Inc., industrial and commercial painters and decorators. He apparently has been doing quite a chunk of work for the Institute including the DuPont gym, Compton Lab, Kresge Auditorium, Chapel and the new Women's Dorm. The Russells have two sons: Stan Jr., who graduated from Harvard College and Business School and is working in San Francisco; and Robert, who graduated from Harvard and is a student at Columbia Medical School. Stan, Sr. is a director of the Boston Executive's Association and active in church work.

Ralph Scott is executive vice-president of Osborn Engineering Company, Consulting Engineers of Cleveland, Ohio. He is a fellow of the A.S.C.E. and lecturer at Fenn College. He reports having worked with **Cedric Roberts** on an Erie Railroad freight repair shop program at Meadville, Pa. . . . **Asa "Zeke" Shannon** is in charge of project planning for the Missouri River Division, Corps of Engineers. His division is concerned with the planning of major dams on the Missouri and its tributaries, as well as major military installations in the Missouri River region. The Shannon's daughter Lorene graduated from Omaha University in fine arts (sculpture) and expects to receive a degree in architecture from Carnegie Tech in June, 1964. . . . **Joe Shelley** is associate professor of history of architecture at Columbia's School of Architecture. He apparently spends his summers at Glenwood Springs, Colo. where he participates in the summer program of a private preparatory school. Last summer, in collaboration with a music teacher and several students, he built a small harpsichord and a clavichord. He is also writing a book on design and translating an early French Renaissance treatise on architecture. He reports that from time to time he sees **Fred Markham,** who is practicing architecture in Provo, Utah. . . . **Bob Sidur** is with Western Electric in N.Y.C. working in government communications systems. The Sidurs live in Maplewood, N.J. Their older daughter, Patricia, is married with two children. Son Richard graduated from Utah State and is studying for his doctorate at Stanford. Younger daughter, Charlotte, is in high school.

Felix Padilla writes that he is "owner and president" of Namei Polytechnic Institute, a combination high school and college in Mandaluyong, a suburb of Manila. It appears that one of Felix' principal problems as a school administrator arises out of the fact that there is a great shortage of books in the Philippines. In commenting on this problem he says: "I wonder if you could possibly lend a helping hand to a fellow alumnus. I established a college in Manila in 1946 and a high school in 1961 whose enrollments keep on increasing every year and as a requirement by the government, I have to increase the library books in direct proportion to the increase in student population. Could it be possible to extend your help by donating old and secondhand books? The school is founded not for profit-motive, but as a humble contribution to my country for the purpose of elevating the education of the people, as ignorance is a very fertile breeding ground of Communism."

My inquiry concerning the type of book Felix would like to have failed to elicit any details; apparently any book useful to a high school or college student in connection with his school work would be gratefully received. My suggestion is that if you feel inclined to help Felix out, you either 1) send such books as you have available directly to Felix at 123 Avenue Mabini, Mandaluyong, Rizal, P.I., or 2) if you prefer to make a monetary contribution, send me a check. I find that Barnes & Noble here in New York have an extensive stock of used school books and make periodic shipments to the Philippines. I will undertake to convert your contributions into suitable books and arrange for their shipment to Felix in Manila. . . . Changes of address: **Lawrence Gonzalez,** American Embassy, APO 292, New York; **Wilfred Howard,** U.S. AID/China APO 63-Box 7, San Francisco, Calif.; **Ludwig Jandris,** 172 North Main Street, South Hadley Falls, Mass.—**Gordon K. Lister,** Secretary, 530 Fifth Avenue, New York 36, N.Y.; Assistant Secretaries: **Charles T. Abbott,** 26 Richard Road, Lexington 73, Mass.; **Louise Hall,** Box 6636, College Station, Durham, N.C.; **Ralph W. Peters,** 16 Whitestone Lane, Rochester 18, N.Y.

'32

Frank R. Cook, Course XVI, President of Science Management Corporation, a Denver firm specializing in management services for science based companies, has an interesting operation going. An Information Services section of the company will research and digest for clients the technical information in any area of interest. A Marketing Section will advise western industries on the new technologies deriving from aerospace research. And a new division called New Directions for Corporations will match a company's resources with new and future market factors. Frank was earlier head of the development branch of the War Department General Staff's Research and Development Division and later director of aeronautical research and development planning for Honeywell before coming to Denver to found Colorado's first avionics company manufacturing airborne power supplies. . . . **Oliver H. Scharnberg,** Course XV, has been elected vice-president of John P. Chase, Inc., investment counsel in Boston. He will continue as vice-president and director of Craftsman Life Insurance Company. . . . **Lawrence Berk,** Course IV-A, while a radar engineer for the Raytheon Company, also pursued the avocation of teaching modern music. In 1945 his avocation got the better of his vocation and the Berklee School of Music has resulted. Today Lawrence presides over a faculty of 40 and a student body of 240 who show a remarkable dedication to teaching, studying, and creating jazz. In the close-knit world of jazz, obscure only to the world at large, the school has become a beacon and a mecca to which major band leaders look for a vital supply of fresh new musical talent. It certainly appears that Lawrence is doing what he enjoys and it may not be too far removed from creative communications engineering.

We have too many changes of address to report fully in these columns, but your secretary will be glad to help you locate any classmate of whom you have lost track. There are a few address changes which should have a newsworthy story behind them which we regret we do not have to pass along to you: **Ralph D. Patch,** Course X-A, from Darien, Conn., to Esso Standard Italiana, 40 Via Assarotti, Genoa, Italy; **Thomas H. Jenkins,** Course II, from Houston, Texas, to Bechtal International Company, 37 Avenue Pierre de Serbie, Paris 8, France; **Modesto Ulloa,** Course X, from Rome, Italy, to Calle Juan Maria Perez 2711, Apartado 401, Pocitos, Montevideo, Uruguay, South America; **Lawrence A. Ludwig,** Course I, from Adelaide, Australia, to 682 East

37th Street, Brooklyn 3, N.Y. . . . We also regret to notify you of the death of **Alan B. Burns,** Course I, on December 11, 1963.—**Elwood W. Schafer,** Secretary, Room 10-318, M.I.T., Cambridge 39.

'33

I have before me a picture of the Gillette daily shaving class showing three fellows shaving at the same mirror—quite a trick, I assure you. It is difficult to be sure who is shaving whom! I have the picture because our own **Meyer Shnitzler** heads the 90-man research department at Gillette. Meyer and his staff are working on the uses of stainless steel. . . . This one is refreshing, although a bit uncomfortable to the few remaining Republicans. The headline says, in effect, the Democrats selected a novice, **Lynn A. Williams, Jr.,** as their candidate for Congress in the 13th Illinois District, North Cook County. If this Williams is a novice, I am an Oriental. Lynn was graduated from Yale, and Harvard Law, then, did post-graduate work at M.I.T. Being a Republican, I can't wish him success, but I can, and sincerely, offer congratulations on his selection as a candidate.

This one is astounding—an engineer (now architect) writing poetry! From Detroit comes a poem entitled "The Troupers," by **Berj Tashjian,** a project architect with King, Lewis, Inc. Berj tells us that his poem took third prize in Poetry, 1963 ARARAT, a monthly publication. And, his $10 prize went to the Institute. Good for ol' Berj. There must be a number of us with talent like Berj's; talent that could be put to work for the Bob Kimball Fund (more on that later). Surely there are many who are poets, writers, composers, whose talents are professional enough for a try at something. However, let us not lose sight of our objective; you furnish the talent, collect the money, and send it to the Alumni Association. Failing that, why not write Berj a note, with a copy to me, asking for a copy of the poem, and giving him a short essay on your progress over the years. Berj's address upon request. . . . The above is all news, and recent. These few items that follow are about men whose stories have appeared in recent issues of The Review: **Dayton Clewell,** who has been elected senior vice-president of Socony Mobil; a short review on **Bob Winters** future (Ye gods, with a past and present like that enjoyed by Bob, no one needs to guess about his future. If a Canadian has to run it, chances are it will be Bob); **Phil Coleman**'s election as president of Bristol Brass; the announcement of **David B. Smith**'s appointment as visiting professor of electrical engineering at the Moore School, University of Pennsylvania. Dave's specific duties sum up about as follows: pursue studies of, and development of, a graduate level curriculum in the aspects of technical innovation and systems engineering. Would it be fair to ask Dave, in confidence, what this means?

We have the results of the class election. It is my great pleasure to announce that the slate of officers which appeared in the March issue, has been elected unanimously. A couple of officers voted, by omission, for themselves. Notable among these, were **Goodridge** (orally), **George Henning,** and **Jim Turner.** I can't mention any of the other classmates, as they refused to include information on themselves. I didn't need the votes, I needed information—gossip, facts, hearsay, anything! The Alumni Association furnishes all class secretaries with press clippings, and they are a life saver. But that way, we hear only from men who are in the public prints. We must have many private sources of information, unless this column is to become a news story review.

I have a fine letter from **Jim Turner,** Talon, Meadville, and a more loyal and dependable classmate would be hard to locate. I also had a short note from **George Henning** with his vote enclosed. Jim, George, and Ed Goodridge, President, met earlier in the month, in N.Y.C., and, among other things, they discussed the status of the **Bob Kimball** Scholarship Fund. They now tell me that all moneys donated by the class to the Institute during the years 1964 and 1965, will be credited to the Fund. The goal is ambitious; although I have no final figure on how much we have to raise. So it rests with all of us, and there will be no rest. Mention will be made in every set of class notes from now on. We are committed for the amount of money which will cover a complete scholarship, in memory of a dear friend of us all. We must hope for a few larger than average donations, of course, but every classmate should be willing to make a donation, even if it is very nominal indeed. Not only do we wish to put the project over with a bang, but we also want a very large percentage of the class making some donation, however small. We will really put the pressure on at the end of both years when you fellows are casting around for a place to put your deductibles, but, it is unnecessary to wait until year end. Why not make this year's donation now?

After two weeks around the cattle circuit, I return to find a letter from **Bill Pleasants**, written from Green Bank, W. Va., where he is chief engineer of National Radio Astronomy Observatory, operated by Associated Universities, Inc., of which M.I.T. is one. Bill is in the process of designing a radio telescope for much higher frequency, and better accuracy. Bill has recently been at the Institute visiting with Professor Mar of Aeronautical Engineering, and Lincoln Laboratory, both consultants on his project. He intends, he says, to take a few short courses at the Institute next summer. Bill seems to find himself in a spot, common to a lot of us; lack of education. ". . . Too late to classify is a note from our own **Bill Baur,** who has been with General Electric for many years. Bill offered his vote, on the straight ticket basis. He qualifies for getting his name in the paper by writing a personal note. He wishes, first, to offer the appreciation of his good wife and himself for the good job the 30th reunion committee did for us all. Thanks, Bill. Bill lives in the Delaware Valley area, and belongs to the M.I.T. Club (of that location) and attends meetings. Now, is that not another good place for you men to pick up gossip for this column? Incidentally, Bill is strong for a formal 35th Reunion, an opinion in which I, and your president concur. Bill, since the 30th, has become a grandfather, and, by writing a note, qualifies as a charter member. He calls himself a "Pure Engineer and Dreamer Designer," and now is working in the field of Power Conversion, and mentions Silicon Rectifiers, just as though he thought I would understand.

Belatedly, we hear of the passing of one of our classmates, **Don N. Higgins, Jr.,** of Houston, Texas. Also, belatedly, Don's family has our deepest sympathy, and best wishes; if any or all of us can help, now or later, please get in touch with us. I would like to hear from **Duke Selig,** if he has any particulars on Don's passing. . . . That's it for now, fellows. Let us have a few more personal notes. I will keep asking.—**Warren J. Henderson,** Secretary, Fort Rock Farm, Exeter, N.H.

'34

In the expectation that this issue of The Review will reach you a week before our 30th Reunion at the Wychmere Harbor Club, Harwichport, on June 12-14, the reunion committee has one more chance to assure a warm welcome to classmates who find at this last minute that they can come after all. All that is needed is an immediate note to committee chairman **Norman Krim,** Room 33-213, M.I.T., with a $15 reservation check payable to the Class of '34. If time is too short for the mail, telephone reunion headquarters at UN-4-6900, Extension 2265 during the day, or Norman's home phone 617-332-2774, during the evening. The mid-April count of reunion reservations is 66 classmates with 59 wives and 6 children, almost all arriving on Friday. A fine program has been planned. For those who are driving to the Cape, the recommended route is to follow Route 6 (Cape Highway) to Exit 10, and turn right to Harwich Center. There turn left, then first right to Route 28. Turn left on Route 28 then first right (Snow Inn Road) to the club. Any classmate coming by air or rail who would like a lift to the Cape should phone reunion headquarters.—**Harold E. Thayer,** Secretary, 415 West Jackson Road, Webster Groves 19, Mo.; **M. S. Stevens,** Secretary, 9 Glenfield Road, Barrington, R.I.; **J. P. Eder,** Secretary, 1 Lockwood Road, Riverside, Conn.; **G. K. Crosby,** Secretary, 44 Deepwood Road, Darien, Conn.; **Norman B. Krim,** Reunion Chairman, Room 33-213, M.I.T., Cambridge 39, Mass.

'35

Leo Beckwith sat at the same table as **Larry Hall** at the last Alumni Council dinner. Larry is the new president of New

Hampshire Insurance Company, Manchester, N.H. He joined the company in 1944 after field work as a civil engineer following graduation. He was named vice-president in 1957 and executive vice-president of the New Hampshire Board of Underwriters, chairman of the board of governors of the New England Fire Insurance Rating Association, a member of the executive committee of the National Board of Fire Underwriters, a director of the National Automobile Underwriters Association, and a member of various other industry committees. A resident of Amherst, he is a trustee of the Elliot Hospital and the Manchester Savings Bank, as well as a director of several of the New Hampshire Insurance Company's affiliated corporations. Larry is married to the former Elizabeth Gale and is the father of two sons, David, currently a junior at Yale University and Lawrence, Jr., in his first year at Rensselaer Polytechnic Institute.

Roy P. Whitney is dean and vice-president of the Institute of Paper Chemistry as well as general chairman, Research and Development Division, the Technical Association of the Pulp and Paper Industry. If Roy reads these notes, I hope he will write and tell us what he does in his spare time out in Appleton, Wis. . . . **Gerry Golden**'s new address is 83 Hammondswood Avenue, Chestnut Hill, Mass. . . . Colonel **John W. Hansborough** has moved to 2014 Travis Heights Boulevard, Austin, Texas, from Seattle. . . . A number of our classmates were seen at the I.E.E.E. show and convention in New York City back in March: **Gerry Rich** was there all the way from Santa Cruz, Calif., and promised a long letter for the next Review. **Howard Beck** and **Forrest Goldsmith** were kept busy at the BTU Engineering booth as were George Sweetnam, '33, and Joe Keithley, '37, at their respective booths of United-Carr Fastener and Keithley Instruments.

Pete Grant was also at the same Alumni Council dinner, and Leo reports that Pete is in the process of setting up his own new company for research and consulting. **Cason Rucker** was the third '35er Leo saw there. Cason "hasn't changed a bit, looks great, and is with the Factory Mutual Insurance Company laboratory in Norwood." Leo adds: "After dinner we listened to a talk by Julius Stratton, '23, regarding the present undergraduates. After seeing some of the statistics on the caliber of the students applying to Tech, the Alumni in the audience realized that we were darn lucky to have gone to school when we did. We probably not only couldn't qualify for admissions today, but I don't think we would have even qualified for the group that was turned down. At any rate, it was a very interesting evening and we learned a lot more about the problems and real progress being made at M.I.T." . . . I am sure I speak for my classmates in extending sympathy to Mrs. Wiener on the sudden death of Professor Norbert Wiener in Sweden. Many of us had him in class. I missed that, but I did have some wonderful summers with him climbing mountains around Sandwich, N.H., where our summer homes were less than two miles apart. . . . Last call for Alumni Day. We shall be looking for you under the 1935 banner.—**Allan Q. Mowatt,** Secretary, 61 Beaumont Avenue, Newtonville 60, Mass.; Regional Secretaries, **Edward C. Edgar,** Kerry Lane, Chappaqua, N.Y.; **Hal L. Bemis,** 510 Avonwood Road, Haverford, Pa.; **Edward J. Collins,** 904 Merchandise Mart, Chicago 54, Ill.; and **Gerald C. Rich,** 105 Pasatiempo Drive, Santa Cruz, Calif.

'36

As you read these notes, bear in mind, that the deadline date for their preparation coincided with that for Uncle Sam's annual horror and that of the Commonwealth. Ah me! I was muchly cheered by a recent note from **Doug Cairns** who had no news to report but wrote anyway. Thank you, Doug. I quote: "No one but **Bob Gillette** and me is silly enough to spend his life in a country that has the best skiing, hunting, fishing, boating and living in the United States. Especially if you can spend a few weeks each winter in one of the more southern climes. We're still peddling gasoline and heating oils with some side lines in real estate developments, natural gas explorations, and politics of course. Our youngest son graduates (hopefully) from Syracuse this June. After that the grandfolks are going to have more time and money to enjoy what we came to Vermont to do in the first place." Doug's address is Champlain Oil Company, Burlington, Vt. . . . I have two addresses to report: **John B. Roberts** at 2303 West 11th Street, Wilmington, Del.; and **James Seth** at 639 Ulfinian Way in Martinez, Calif.; and I am still at the same old stand.—**Alice H. Kimball,** Secretary, 20 Everett Avenue, Winchester, Mass. 01890.

'39

To get the very latest information possible in this monthly column concerning the 25th Reunion on June 12 through 14, it took a delayed deadline with the cooperation of The Review editors, plus some last minute telephoning to Chairman **George Beesley** at his Servend, Inc., office in Waltham, Mass. So here's the latest, as of April 21: at least 175 Alumni, 160 wives, and 200 children are expected to sign in at Baker House for the biggest 25-year affair our class will ever have! And if any doubting '39ers wish to challenge that comment, there's still time and space for some last minute registrations. Phone or wire **Seymour Sheinkopf** at 205 Wolcott Road, Chestnut Hill, Mass. 02167 (Business phone: Area 617, 298-9300; Home phone: Area 617, 566-3167). And if you can't reach Seymour, try George at the Servend phone: 617, 893-7310. But call someone, and quick! Seymour also points out that you are welcome to come for a part of the weekend even if conflicts prevent full attendance. Cost will be pro-rated accordingly.

We need more wives to send along news of husbands' promotions, like the following item from the Westport (Conn.) Town Crier, sent to me by Doris Lyons: "**Lawrence M. Lyons,** VI, has been appointed manufacturing manager of the Burndy Corporation, Norwalk, Conn. Prior to this new appointment, Lyons was manufacturing manager, Utility-Industrial Division, and has served in various manufacturing management capacities since joining Burndy in 1940. Burndy, a leading manufacturer of electrical connectors and related equipment, his plants in Norwalk, Milford, and North Haven, Conn., Toledo and Cincinnati, Ohio, New York City, and Providence, R.I. Larry, a registered professional engineer, and a member of the Institute of Electrical and Electronic Engineers, lives at 41 High Point Road, Westport." Thank you, Doris. . . . **Aaron White**'s work on the Class Book for the reunion unearthed one sad news item. The biographical Data Questionnaire was returned for **Felix Waitkus,** XVI, by Lance B. Jones, a friend of the Waitkus family. Colonel Waitkus passed on in June, 1956. His address at the time was 429 Ridge Court, Kohler, Wis. I believe that his wife Martha and son Phillip are still there in Kohler. Phillip is studying for his Ph.D. at Tulane University, New Orleans. Mr. Jones filled out the questionnaire for Colonel Waitkus and I will summarize: Upon graduation, he was commissioned into the U.S. Army Air Corps, where he served as Assistant Air Force Plant Representative at Boeing Aircraft, in Seattle, until 1945. For a few months prior to release from active duty, he served as deputy base commander at Lubbock with the responsibility of preparing some 1200 B-17 aircraft for storage at the base. From 1946 to 1951, he worked first as a sales engineer for Boeing and then as project co-ordinator on the military modifications contracts. He was recalled to duty in 1951 to serve in the Inspector General's office on procurement inspection. In 1954, he was sent to Europe as chief, Procurement Surveillance Division.

W. Robert Hydeman, XVIII, a specialist in management information and data processing, has joined George Fry and Associates as director of management services, in the Western Division headquarters of Fry in Los Angeles. Hydeman, a former manager of systems and procedures planning for Lockheed Missiles and Space Company, is also serving currently as chairman of the College of Management Information of the Institute of Management Sciences. He is a graduate of Miami University, Ohio, received his M.A. in mathematics from Syracuse, and did graduate work at both M.I.T. and George Washington University. He lives at 3366 Ross Road, Palo Alto, Calif.—**Oswald Stewart,** Secretary, P. O. Box 1238, Moravian Station, Bethlehem, Pa. 18018.

'43

How the years do slip by! With the memories of a gala 20th class reunion still fresh in mind, a group met in Cambridge

in April to start planning the 25th. Class President **Jim Hoey, Jr.** announced the appointment of **Edmund R. "Ned" Swanberg** as Chairman of the 25th Reunion Gift Committee. Also present were **Jim McDonough,** Class Agent; **Ken Wadleigh,** Dean of Student Affairs; **Ken Warden,** who was chairman of our 20th Reunion; yours truly; and Ken Brock, '48, of the M.I.T. Alumni Fund staff. Ned kept us working from 7 P.M. until midnight, and it is a sure thing that under his capable leadership our class will be proud of its gift when it is presented to M.I.T. in June of 1968. Ned, who has been active in community affairs in New Canaan, Conn., where he resides, is a general partner and director of research of Scudder, Stevens & Clark, investment counsel, of New York. The June reunion at Tech beckons one and all, and is a great get-together. See you there.—**Richard M. Feingold,** Secretary, 10 North Main Street, West Hartford, Conn. 06107; **John W. McDonough, Jr.,** Assistant Secretary, 525 North Lincoln Street, Hinsdale, Ill.; **Christian J. Matthew,** Assistant Secretary, Research Specialties Company, Richmond, Calif.

'46

A recent article from the Boston Globe tells of **John A. Knauss'** new activities. Dr. Knauss was director of research at the Scripps Institute of Oceanography at La Jolla, Calif. He has recently been appointed dean of the School of Oceanography at the University of Rhode Island. The graduate school offers both master's and Ph.D. programs, and John predicts that the school will soon be turning out nearly a dozen trained oceanographers a year. . . . **Ralph W. Rawson,** vice-president and assistant to the president of Fansteel Metallurgical Corporation, is leaving the firm to become president and member of the board of Firth Sterling, Inc., Pittsburgh, manufacturers of special steel alloys, wires and tools. Ralph graduated from the U.S. Naval Academy in 1939 and received his master's from M.I.T. in 1946. . . . **Carroll J. Brown** has joined The Singer Company as director of management development. After receiving his M.S. from M.I.T., he served on the faculty from 1946 to 1955, teaching industrial management. He has been associated with Mobil Oil Company and Standard-Vacuum Oil Company since then. Carroll, wife Elizabeth, and children Jonathan and Elizabeth live at Dawn Harbor Lane, Riverside, Conn.

We have the following new addresses to report: **Stanley A. Young, Jr.,** 32 Amherst Drive, Hastings-on-Hudson, N.Y.; Reverend **Robert Urquhart,** 5801 South Campbell, Chicago 21, Ill.; **John R. Tedesco,** 7711 Heming Place, Springfield, Va.; **Earl D. Romig,** 836 Main Street, Reading, Mass.; **David A. Kleinman,** 411 Huntington Avenue, Plainfield, N.J.; **Robert L. Jacks,** The M. W. Kellogg Company, 711 Third Avenue, New York, N.Y.; **George R. Grainger,** 15449 Darien Way, Clearwater, Fla.; **Salvatore R. Chiefa,** 4690 N.W. 5th Street, Plantation, Ft. Lauderdale, Fla.; **Robert J. Campbell,** Beech Hill Road, Pleasantville, N.Y.; and **Dominic Amara,** 19044 Marilla, Northridge, Calif. Happy Father's Day.—**John A. Maynard,** Secretary, 25 Pheasant Lane, North Oaks, St. Paul 10, Minn.

'49

As you read this, we will be only a few days away from our Grand Slam 15th Reunion at the Cape (at the Hotel Belmont in West Harwich, June 12, 13, and 14). And if you are one of those who couldn't even guess until now if you could make it, here is a word of advice. Chuck everything and come! It is not too late and you will have the fun you so richly deserve after working so hard all winter. Just drop me **(Fletcher Eaton)** a card and the boys will have everything ready when you arrive. Or add a little excitement to our lives at the last minute: don't drop the card but come anyway. We have made allowances for that, too. As this is written (April 19), we have just received such a batch of late confirmations that we are pretty sure we will set some sort of new attendance record for a 15th. Usually, this one isn't considered to be a major reunion year, but with the spirit our class has and a big committee working like beavers for over a year, something has to give. Just for the record, here is the entire committee: **Stan Margolin** and **Wally Row,** Reunion Co-Chairmen; **George McQueen** and **Larry Holt,** Registration; **Fletcher Eaton** and **Dick Lang,** Program; **Joe Lynch** and **Ed Kerwin,** Publicity; **Russ Cox** and **Kemon Taschioglou,** General Advisers and Chairmen for Friday and Saturday nights respectively; **Bob Cowen,** Photography; **Paul Johnson,** Questionnaire; **Neil Morrison,** Activities; **Tom Tsotsi,** Purchasing; **Stan Margolin** and **Henry Lambe,** Finance.—**Fletcher Eaton,** Assistant Secretary, 83 Herrick Road, Newton Centre, Massachusetts 02159; **Frank T. Hulswit,** Secretary, 197, Knightsbridge, London S.W. 1, England.

'53

Our 11th Reunion Cocktail Party at 6:30 P.M. on Friday, June 12 will be held at the M.I.T. Faculty Club. Let me know that you will be there. . . . Our retired fearless leader, **Paul Shepherd,** I, is doing his part in the new construction and land development boom in and around Boston at Cabot, Cabot, and Forbes. Paul spends a fair amount of time traveling to Philadelphia, San Francisco, Los Angeles and Phoenix, which sounds like a nice combination! He was elected to the Town Planning Board of Reading Mass., and also claims to share co-responsibility with Virginia for five deductions. . . . A very interesting bit of information was received from **Ben Coe,** X, who reports that he is on the board of directors of an organization named VITA (Volunteers for International Technical Assistance). This group is carrying on its own Peace Corps activity by replying to technical problems sent in from individuals and groups in the developing countries. Ben indicates that there is a real need for more volunteers for this organization. Interested parties can get in touch with Ben at 2144 River Road, Schenectady, N.Y. In order to provide "assistance" to his wife, Peggy, and their three children, Ben works for General Electric as a plant start-up project supervisor. . . . One of our remaining bachelors (by last count about 8 per cent), **Jay Berlove,** XV-B, is doing his share to bring civilization to the natives. In particular, Jay is treasurer of the Niagara (N.Y.) County Democratic Committee, and in 1961 ran a close second for an elective public office. In his spare time, Jay is a purchasing agent for the Carborundum Company.

Don Jongbloed, I, reports that he is presently procurement manager for the General Products Division Development Laboratory of IBM in Endicott, N.Y. Prior to this assignment, Don was manager of facilities operation and maintenance. Shortly after leaving Tech, Don spent almost six years with the Air Force, the last three of which were spent in Tokyo as an installations engineer, and in 1956 he received an M.B.A. from the Air Force Institute of Technology in Dayton, Ohio. The Jongbloed family (wife, Carol, and their three children) reside in Apalachin, N.Y. . . . **Fred Brecher,** XVII, maintains his love nest in Wynnewood, Pa., and is joined by his two girls, Sandi and Leslie, and son David. Fred is a structural engineer with the firm of Dorfman-Bloom, Inc. . . . **John Batter,** II, now lives in Lexington, Mass., and is at Technical Operations, Inc. where he is director of both the Industrial Defense Planning and the Radiation Products Division. Prior to Tech Ops John attended the Oak Ridge School of Reactor Technology and spent a short time with United Aircraft in Connecticut. In addition to raising their own brood, the Batters maintain four cows, presumably for internal consumption.—**Norman R. Gardner,** Secretary, 100 Memorial Drive, Cambridge, Mass.

'55

In March, Aviation Week Magazine published a feature story on the Interplanetary Monitoring Platform (IMP) Satellite. A new magnetohydrodynamic shock wave has been discovered from measurements made with the satellite under the direction of Dr. **Norman F. Ness** of the NASA Goddard Space Flight Center. I was at Goddard in April and dropped in to say "Hello" to Norm, congratulate him for the fine success of his scientific work, and talk over old times. As many of you might remember, Norm is one of those fellows who way back in 1952 or so thought there was something in this geophysics business besides oil exploration, and took his degree in Course XII-B which hardly anybody knew existed. Of course, with the advent of Sputnik, things picked up somewhat; and Norm is right at the forefront. Rumor has it

around Goddard that his work ranks with the most important research being done at the center. . . . **Mel** and Hope **Barkan** have returned from their exotic honeymoon in Mexico and Guatemala and have taken up residence in Charles River Park in Boston. The wedding was held in February at the Carlisle Hotel in New York City. **Dennis Shapiro** was best man.

George B. Raymond was elected vice-president of Raymond Engineering Laoratory, Inc., Middletown, Conn. The company designs, develops, and manufactures electromechanical components and subsystems for the aerospace industry. . . . **Samuel C. Goldman** has joined the staff of Di-An Controls in Boston as a senior project engineer. . . . During the winter, Sandy and **Bob Posner** spent a week in the Miami area and as Sandy puts it "collected copious data on ionospheric absorption." Bob is presently heading the Posner Construction Company of Baltimore and is involved in the erection of a high-rise luxury apartment house. It is quite an undertaking that will keep Bob out of mischief for the next few years. Anybody looking for an apartment in Baltimore hopefully will call him first. . . . Dr. **Lawrence P. Kaufman** of Malden, Mass., Director of Research for Man-Labs, Inc., has been named winner of the Rossiter W. Raymond Award of the American Institute of Mining, Metallurgical, and Petroleum Engineers. Dr. Kaufman was honored for his paper, "Estimation of the Entropy of NaCl Type Compounds." The Raymond Award was established in 1945 to honor the author of the best paper published annually by a member of A.I.M.E. under 33 years of age.

Dr. **Robert F. O'Malley** spoke on "The Chemistry of Some Nitrogen Compounds" before the Central Massachusetts Section of the American Chemical Society at Holy Cross College. Dr. O'Malley is chairman of the Chemistry Department at Boston College and a native of Framingham. . . . Dr. **J. Frederick Woessner, Jr.,** has been promoted to associate professor in the University of Miami School of Medicine. Dr. Woessner has held an appointment in the department of biochemistry since 1956 and is an investigator for the Howard Hughes Medical Institute Laboratory for Cardiovascular Research. His current research interest is in the biochemistry of connective tissue. . . . **Henry E. Theis** has been appointed machinery sales representative at the St. Louis Service Center of Joseph T. Tyerson and Son, Inc., one of the nation's leading distributors of steel, aluminum, industrial plastics, and metalworking machinery. . . . See you again next month. —Co-secretaries: **Mrs. J. H. Venarde (Dell Lanier)** 2401 Brae Road, Ardentown, Wilmington, Del. 19803; **L. Dennis Shapiro,** Aerospace Research, Inc., 130 Lincoln Street, Brighton, Mass. 02135.

'57

There is a matrimonial note to start off this month's news: **Terence Porter** was married to Sharon Irene Carlsen on April 4 in Washington, D.C. . . . Now back to the mailbag. The following letter was received from **Albert Klainer:** "After graduating from Tech (Course XX) in 1957 I gave up strict science and went to Tufts Medical School. Upon completion of my studies there in 1961, I interned and finished a year of residency in internal medicine at the Pratt Diagnostic Clinic of the New England Center Hospital in Boston. Presently I am a research fellow in infectious diseases and assistant in medicine at the same hospital. My work is in the area of bacterial toxins and fluorescent microscopy. Nine days after graduating from Tech I married Jo-Ann Showstack of Simmons at the M.I.T. Chapel. We now have one child, a boy, and are living in Randolph, Mass." . . . Last fall **Jerry Carter** wrote: "I am working for Atomics International as the process test engineer during the start up of a nuclear reactor located in Piqua, Ohio. This job should be over about the first of the year, at which time I will return to the home office in Canoga Park, Calif."

I have recently learned that **Greg Gaertner** is a scientific programmer for Minnesota Mining and Manufacturing Company, for whom he has worked since June of 1959. Greg and his wife, Evelyn, live in Saint Paul. . . . **Henry Eder Caicedo** recently brought me up-to-date on his activities with this short note: "I spent two years, 1960 to 1962, at the London School of Economics doing graduate work. At present I am working for Manuelita, S. A., in Palmira, Columbia. On October 4 I married Elena Garcés." . . . Next month I will report on the remaining letters. I plan to attend the Aumni Day Banquet at Tech on Monday, June 15. I hope a number of you will be there also to take in the Alumni Day schedule of events.—**Frederick L. Morefield,** Secretary, 1-A Acorn Street, Boston 8, Mass.

'59

The reunion is now only days away. I hope everyone who cannot attend will drop me a line during the next few weeks and bring me up to date on recent changes in his job, family and so on. . . . **Arthur Moore** is now living in Eindhoven, Holland. Art was married in 1960 in Lugano, Switzerland. In 1963 he finished his Ph.D. in chemical engineering at Imperial College in London. Art is now employed with NV Philips Gloeilampenfabrieken. The Moore's have two sons, 17 months and 5 months of age. . . . **Syl Miniter** wrote with news about several '59ers: **"Seiji Itabora,** X, is presently working diligently at American Cyanimid in Boundbrook, N.J. He is still a bachelor, although I fear his future freedom is in grave danger. He is almost engaged. He has been planning to return to school to finish up his doctorate at Syracuse in September. . . . **Joaquin Borrero** has just finished his master's at Tech in mechanical engineering and is working for General Motors in Indiana. He is married to the former Joan Walsh, a B.U. girl and they have two girls. He is coming to visit us on his journey to Indiana to relocate his family. . . . **Bob Couch,** II, is a first lieutenant in the Air Force and is stationed at Edwards Air Force Base. He is married and can boast of two or three children. He is doing work on solid propellant rockets for the Air Force. . . . **Dick Hall** finished up his Ph.D. in Chemistry at Berkeley in 1963 and is working on the West Coast. He is married now to the former Yolanda Blozan." . . . Syl himself is working for the Microwave Applied Research Lab at RCA Laboratories in New Jersey. Cathy and Syl are the proud parents of a two-year-old boy and a year-old girl. Syl is working on his master's at Brooklyn Polytechnic. Many thanks for the news!—**Robert A. Muh,** Secretary, 165 W. 66th Street (7R), New York 23, N.Y.

'60

Mostly bits and pieces this time. . . . **Ken Myers** writes to say that he was admitted to the Illinois Bar after graduating from Harvard Law School in June of 1963. He is working for the Chicago law firm of Ross, Hardies, O'Keefe, Babcock and McDugald. He and his wife, Susan, "would enjoy hearing from any classmates in the Chicago area." . . . **George Schnabel** has finished his active duty with the Army Chemical Corps and is now working for Rohm and Haas in Bridesburg, Pa. . . . **Doug Bashioum** has taken a job with Aero Performance, Inc., as an engineer programmer. The company is engaged in assessing the possibilities of using computers to speed trans-Atlantic airline flight planning and plans to offer its service to all of the carriers now flying these routes. Doug was formerly a senior aircraft engineer in the Operational Engineering group of TWA. . . . **Lester Earnest** has moved up in the MITRE organization, having been transferred from his position as assistant to the technical director of MITRE's Defense Communications Agency to associate head of the National System Planning Department in the company's Washington office.

Found an interesting account of what one of our classmates has been doing in South America. **Manuel Moreno,** an International Division Sales Engineer for the Cooper-Bessemer Corporation had some excitement late last year. While in Venezuela he was coming from the airport by cab to his quarters in the city. As his cab threaded its way quietly through some of the back streets in the seamier section of town, Manuel heard a burst of gunfire. "I could immediately see that the cab was caught in a cross-fire with machine gun bursts coming from the interior of two buildings on opposite sides of the street. I immediately dived for the floor of the cab, and the cab driver jammed his foot down on the accelerator and zig-zagged away for 200 yards at top speed. We were not injured, except for our feelings. Although battles of this type and riots occur in Caracas quite often, I never pictured myself in the middle of one." (Thanks to the C-B Mani-

fold for the account of the story). I wonder what Manuel has been up to lately. . . . **Ron Atwater** has been having some real adventures while serving with the Peace Corps in Columbia. The latest incident involves Ron's setting up a marketing co-operative among the weavers of a small rural village to manufacture and sell "ruanas"—hand-woven panchos worn by the natives for the last 400 years. Now the items have been "discovered" in the U.S. and the folks in Columbia can't keep up with the demand. All this happened last summer. Reports had it that Ron was heading for the West Coast and a M.A. in business administration. . . . **Bob Sprich** has been serving this year as a director of the Boston Center for Adult Education. Bob is currently teaching mathematics and English at the center and is on the teaching staff of Tufts University where he is completing a Ph.D. in English literature. . . . Finally, it may be a little early to remind you but don't forget that next year is our reunion year, so keep in touch.—**John B. Stevenson,** Secretary, Partridgeville Road, Athol, Mass.

'61

Many of you left campus before Westgate, the married students' apartments on the M.I.T. campus, was completed or even begun. The complex is located west of Burton House, behind the former Howard Johnson's. There are 210 families living here. Other plans call for a somewhat similar development at the other end of the campus, behind the Sloan Building. (Eastgate?) Up till quite recently, my wife and I lived on the top (16th) floor of the so-called "Tower." We have now moved to Andover, Mass. Before leaving, however, I went around to chat with the other four '61ers in Westgate, and catch up on what they'd been doing since June 1961. This column is the result. All of us have gotten master's degrees and are going on for doctorates. **Lenny Coris** is in Ford Technology, **Art Chen** is in Electrical Engineering and **Bruce Bardes** and **John Benjamin** are metallurgists. Bruce was married right after graduation (June 11, 1961). He expects to graduate next September, and is now in the final stages of thesis work. Art married last June; he got his S.M. and S.B. simultaneously in 1962 after being on co-op with Bell Labs. The Benjamins are the only couple among us with a child, as yet; theirs is a baby boy. John got his S.M. in 1962 and expects his doctorate in early 1965.

From Art I heard that **Curt Hartwig** is still at M.I.T., presently beginning his Ph.D. work. Curt was married two years ago, now lives in Arlington. Art had also heard that **Don Graham** was going to India to finish his doctoral work; this sounded interesting enough to check into, so I gave Don a call. He's now living in Baker House, where he is a tutor, but he expects to depart in September for the Indian Institute of Technology at Kanpur. He will continue work on his Ph.D. thesis for the next one-and-a-half years there; Professor Schreiber, his adviser, will also be in Kanpur. While he is there, Don will help in organizing the undergraduate electrical engineering laboratories. . . . Bruce Bardes was able to pass on word concerning quite a number of our colleagues. **Mike Walker** is with Westinghouse in Pittsburgh. **Jerry Kaufman** got his S.M. degree in industrial management last year, and is still here. **Bob Katz** is working at Watertown Arsenal, also goes to grad school at M.I.T. part time. **Craig Tedmon** anticipates his doctorate in June. **Ervin Davis** got both an S.B. and an S.M. in 1962 (Course VI), is now back here, working for his Electrical Engineering degree. **Bob Mroczkowski** is working on his S.M., having worked full-time for DSR for a time since graduation.

I saw **Ed Strachan** when he was in Boston recently; he has finished his Army duty (a tour of the Sunny South) and is back with New York Telephone. He's engaged to a girl from Fort Knox, Ky., whom he met while on duty there. Full details here when I report on the wedding, which will be held this month. I also spoke briefly with **Pete Burleson** last April when he passed through M.I.T. on a one-day visit. Pete's going for his Ph.D. in managerial economics at the Cornell Business School, supported by an N.D.E.A. Fellowship. And while we are reporting on Fijis, **Sandy Wagner** looks forward to another year of teaching math and science at Browne and Nichols School here in Cambridge. Sandy is not only an enthusiastic crew coach, but also coached the B & N basketball team to an undefeated season last winter. . . . A note reaching my desk indicates that **Edward Bing** has recently joined the evaluation group of the Chemstrand Corporation of Decatur, Ala., a firm specializing in, chemical textile fibers. He and his wife Patricia, and their son now make their home in Decatur; formerly he was with Deering Milliken Research Corporation. . . . To those of you who have received our return postcard and have not yet sent it in, don't let it lie on your desk another minute! And those who did not get one and who have something to report—drop me a card on your own. That personal word makes all the difference when it comes to Class News. I get plenty of newspaper clippings and press releases; what I want to write, and what people want to read, is some personal message from you, so that we won't completely lose touch with each other. Thanks, and have a good summer, all.—**Joseph Harrington, 3rd,** Secretary, 22 Hidden Road, Andover, Mass. 01810.

'62

John F. Banzhaf, 3d, Course VI, now in his second year at Columbia Law School, has been selected editor of the Columbia Law Review, the school's internationally known legal publication. John writes that he is now working on an article entitled "Copyright Protection for Computer Programs" and requests anyone having any ideas or information on this topic to drop him a line. . . . **Phil Schmidt,** XVI, wrote me from Texas, where he is working for Bell Helicopter in Fort Worth. Phil is enjoying his work as an aerodynamicist and had a paper published in the October, 1963, issue of the Journal of the American Helicopter Society. He is also secretary-treasurer of the M.I.T. Club of Northern Texas. He plans to get his M.S. at a college near San Francisco next fall. Also at Bell Helicopter are **Earl Hall,** II, who is working in the dynamics group and is living in Dallas with his wife Helen. **Len Lindenmeyer,** VI, is there in the electronics department and will be getting married next summer. Len was recently appointed head of the flight simulator laboratory at Bell. . . . **Pete Neal,** XVI, is working in the aerodynamics department at Tech and living in Arlington with his wife Merrie and two dachshunds. . . . **Al Snyder,** VII, is at the University of Chicago Medical School. . . . **Dave Stein,** VII, is married and is in his second year of medical school at Albert Einstein in New York. . . . **Tom Morgenstern,** XV, is married and is in dental school at the University of Pennsylvania. . . . **Ed Schwartz,** XV, married Pattie Kahn in June, 1962, and is working in an accounting firm in Chicago. . . . **Al Loss,** XV, is working for a management consulting firm in Boston. He received his M.S. at M.I.T. in June, 1963, in Course XV.

Jerry Danburg, VIII, spent a year at the University of Berlin on a Fulbright. His scholarship has been extended another year, and he is probably at a university in France now. . . . **Chet Riley,** XVI, got married last year and is now in the Air Force. . . . **Will Taylor,** XVI, got married to a girl named Pattie from Texas. He has just left Boeing and is now working for General Dynamics in Fort Worth. Incidentally, **Howie Plotkin,** XVIII, is also at General Dynamics. . . . **George Meyer,** VII, is at Tulane Medical School in New Orleans. All of the previous information was sent to me by **Phil Schmidt,** and my deepest thanks go out to him. . . . A recent party in my Mountain View apartment was attended by the following bright lights of the Class of '62: **Bill Bloebaum,** X, **John Ohlson,** VI, **Art Samberg,** XVI, and their wives Margaret, Vernie and Becky. Also present were **Leland Jackson,** VI, **Jan Hyde,** I, and **Gordon Mann,** XV (my roommate). Leland received his M.S. at M.I.T. in June, 1963, and was out here to interview at IBM and Sylvania.—**Jerry Katell,** Secretary, Stanford Business School, Palo Alto, Calif.

'63

It is now a year after graduation, and I have no news to report this month because absolutely no one wrote me anything. Once again, my address is F-41 McCulloch, Harvard Business School, Boston 63, Mass. If we had any money in the treasury I would send everyone a post card to return to me, but we can't afford such extravagances. So take a few minutes of company time and write me a few well-chosen lines.—**L. Robert Johnson,** Secretary, Harvard Business School, F-41 McCulloch, Boston 63, Mass.

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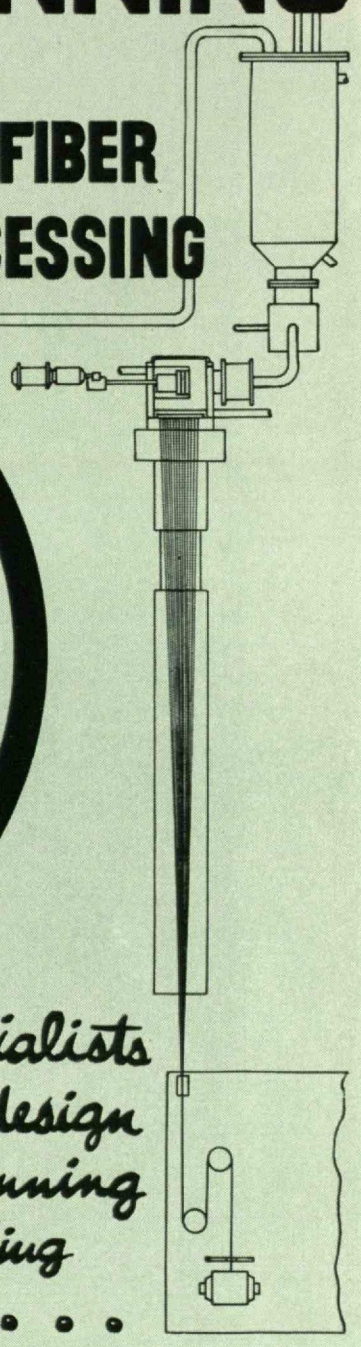

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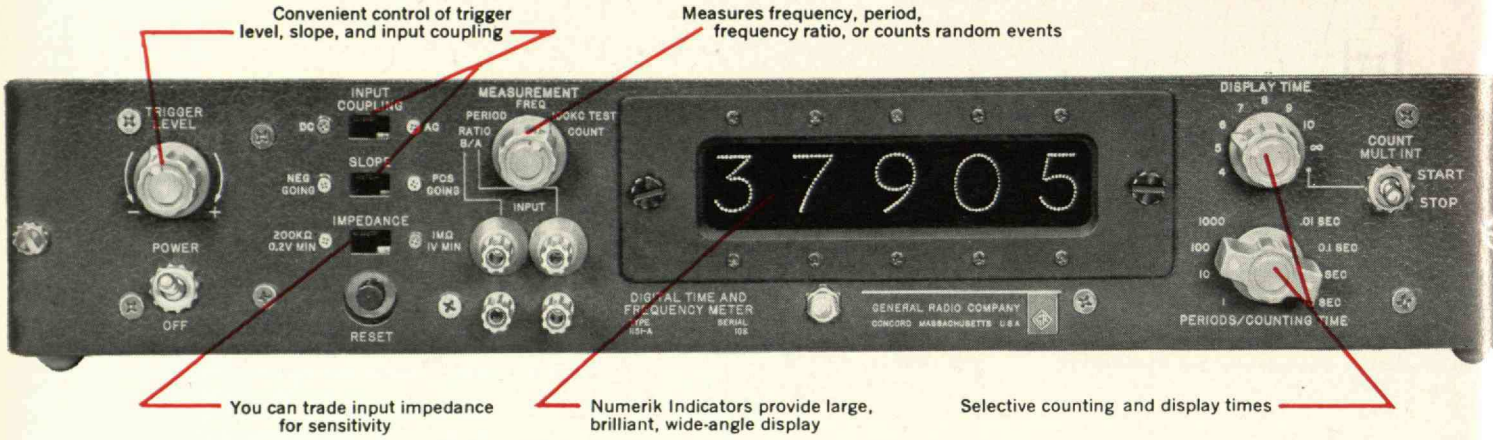

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